snom VoIP phones

m9 DECT

m9 DECT Administrator Guide

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Product specifications contained in this document are subject to change without notice.

Safety Precautions

Please read these precautions and the instructions on setting up and using the base and the phone thoroughly before using the device. Do not give the device to third parties without this guide accompanying the device. See also separate general safety information and country-specific safety and warranty information for the USA, Australia, and New Zealand.

Power Supplies/Adapters, Rechargeable Battery

Use only the power converters (AC/DC adapters) delivered with the base station and the phone or those power supplies expressly recommended by snom ("Power Supplies/Adapters" on page 79). Other power supplies may damage or even destroy the device(s). Use only the rechargeable battery pack delivered with the handset or those rechargeable battery packs expressly recommended by snom (see "Rechargeable Batteries" on page 79).

Placement of Base, Charger, Cables, and Cords

- Avoid placing the devices' cables and cords where people may trip over them. Avoid placing the cables and cords where they may be exposed to mechanical pressure as this may damage them. If the power supply cord or the plug is damaged, disconnect the device and contact qualified service personnel.
- Base station, chargers, handsets, power adapters, and cables are for indoor installation with a temperature range between +5°C and +45°C. **Not for outdoor installation!**
- Do not install product in rooms with high humidity (for example, in bathrooms, laundry rooms, damp basements). Do not immerse product in water and do not spill or pour liquids of any kind onto or into any parts of it.
- Do not install product in surroundings at risk for explosions and do not use the handset in such surroundings (paint shops, for example). **Do not use the phone if you smell gas or other potentially explosive fumes!**
- Medical devices might be adversely affected. Please consider the technical ramifications when installing the devices in a doctor's office, for example.
- FOR THE USA: Do not use near medical equipment or if you have a pacemaker.

Health Precautions

Implanted Pacemakers

- FOR THE USA: Do not use if you have a pacemaker.
- Do not use if you have an implanted pacemaker unless the pacemaker manufacturer's directions expressly permit the use of devices emitting pulsating radio frequency signals. Always follow the manufacturer's directions!

- Recommended MINIMUM distance to the handset: 20 cm (7.9”).
- Do not carry the handset in a breast pocket.
- Hold the handset to the ear opposite the medical device to minimize the potential for interference.
- Turn the handset off immediately if there is any reason to suspect that interference is taking place.

Hearing-Related

Do not hold the loudspeaker at the back of the handset against your ear when the phone is ringing or when speakerphone is switched on. ***Danger of serious, irreversible damage to your hearing!***

If you are wearing a hearing aid, please note that the handset may cause an annoying background noise.

Medical Devices

Operation of any equipment emitting radio frequency signals may interfere with the functionality of inadequately shielded medical devices. Consult a physician or the manufacturer of the medical device to determine if they are adequately shielded from external RF energy or if you have any other questions concerning this topic. Switch off your device in health care facilities when signs posted in these areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Implanted Medical Devices

Manufacturers of medical devices recommend that a minimum distance of 20 centimeters (7.8 inches) should be maintained between a wireless device and an implanted medical device, such as pacemakers or cardioverter defibrillators, to avoid potential interference with the medical device. Persons who have such devices should:

- Always keep the wireless device more than 20 centimeters (7.8 inches) from the medical device when the wireless device is turned on.
- Avoid carrying the wireless device in a breast pocket.
- Hold the wireless device to the ear opposite the medical device to minimize the potential for interference.
- Turn the wireless device off immediately if there is any reason to suspect that interference is taking place.
- Read and follow the directions of the medical device‘s manufacturer.

If you have any questions about using your wireless device with an implanted medical device, consult your health care provider.

Additional Safety Information

Small Children

Your device and its enhancements may contain small parts. Keep them out of the reach of small children.

Operating Environment

Remember to follow any special regulations in force in any area, and always switch off your device when its use is prohibited or when it may cause interference or danger. Use the device only in its normal operating positions. Do not place credit cards or other magnetic storage media near the device, because information stored on them may be erased.

SELV (Safety Extra Low Voltage) Compliance

Safety status of input/output connections comply to safety extra-low voltage (SELV) requirements.

> Warning: To avoid electric shock, do not connect SELV circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and PSTN ports contain TNV circuits. Some LAN and PSTN ports both use RJ-45 (8P8C) connectors. Use caution when connecting cables.

Potentially Explosive Environments

Switch off your device when in any area with a potentially explosive atmosphere and obey all signs and instructions. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death. Switch off the device at refuelling points such as near gas pumps at service stations. Observe restrictions on the use of radio equipment in fuel depots, storage, and distribution areas; chemical plants; or where blasting operations are in progress. Areas with a potentially explosive atmosphere are often but not always clearly marked. They include below deck on boats, chemical transfer or storage facilities, vehicles using liquefied petroleum gas, and areas where the air contains chemicals or particles such as grain, dust, or metal powders.

Sensitive Electronic Equipment

The current state of research concludes that operational DECT phones normally do not adversely affect electronic equipment. Nevertheless, you should take some precautions if you want to operate DECT phones in the immediate vicinity of such equipment like sensitive laboratory equipment. Always keep a minimum distance of 10 cm (3.94“) to the equipment even when the phone is in standby.

Electrical Surges

We recommend the installment of an AC surge arrester in the AC outlet to which this device is connected to avoid damage to the equipment caused by local strikes of lightening or other electrical surges.

Cleaning and Disposal

Cleaning

Use an anti-static cloth. Please avoid water and liquid or solid cleaning products as they might damage the surface or internal electronics of the base, charger, and handset.

Disposal of Phone

This product is subject to European Directive 2002/96/EC and may not be disposed of with general household garbage.

If you do not know where you may dispose of the device at the end of its lifespan, contact your municipality, your local waste management provider, or your seller.

Disposal of Battery

This battery is subject to European Directive 2006/66/EC and may not be disposed of with general household garbage.

If you do not know where you may dispose of the battery at the end of its lifespan, contact your municipality, your local waste management provider, or your seller. Do not incinerate batteries.

Countries Outside the European Union

Disposal of electrical and electronic products in countries outside the European Union should be done in line with local regulations. Please contact local authorities for further information.

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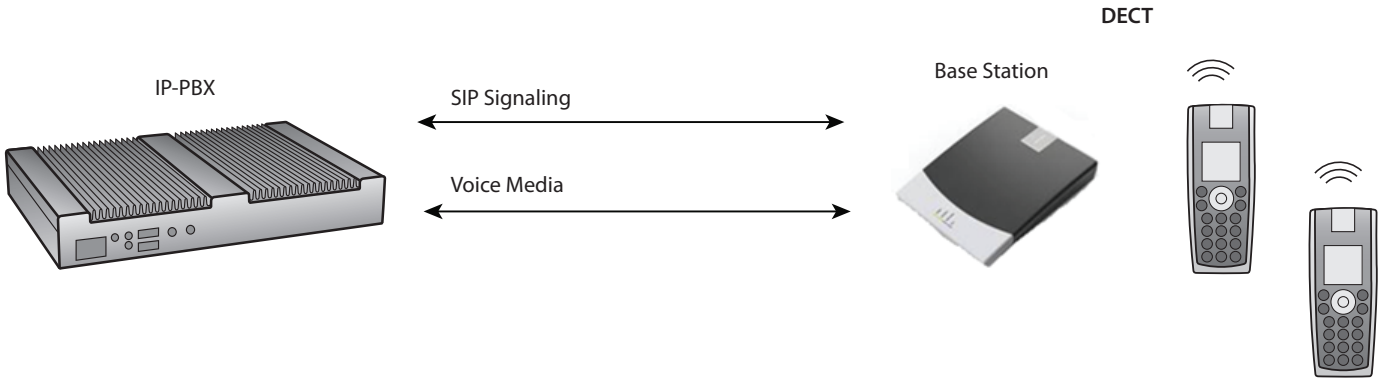
About m9 DECT

The snom m9 is the next-generation DECT (Digital Enhanced Cordless Technology) hand-held that empowers users with the convenience of wireless communication along with the widely accepted benefits and features of Voice over IP (VoIP) telephony.

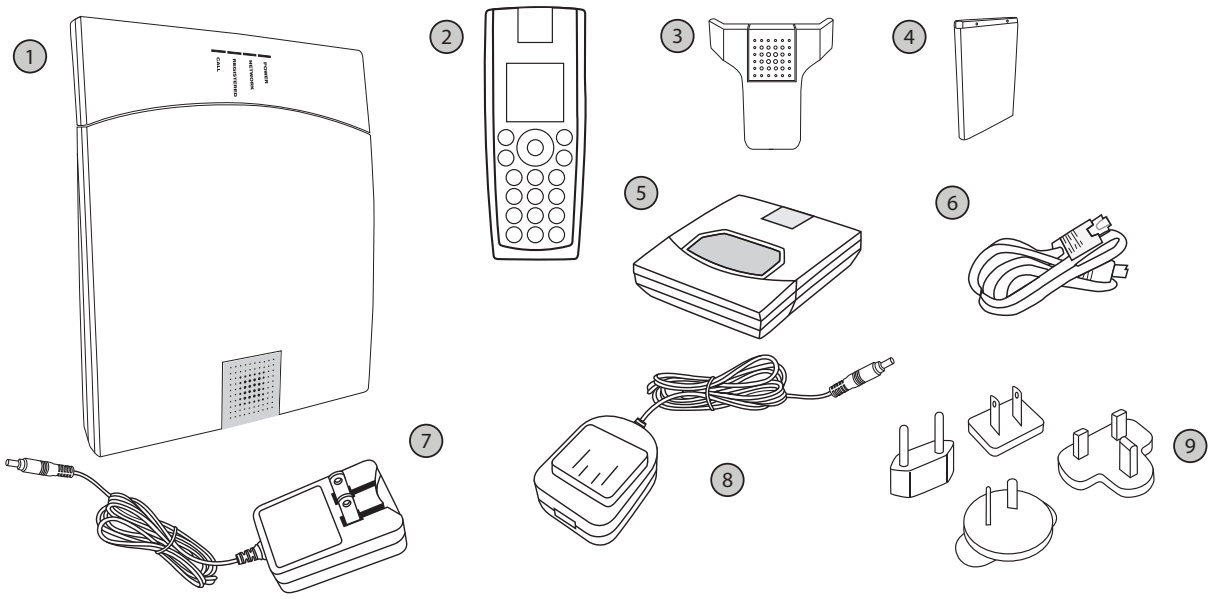
The DECT-based snom m9 provides interference-free communication by making use of the dedicated DECT frequency band. In addition, the snom m9 delivers the typical benefits of the DECT world such as high standby time and superior speech quality in addition to Internet application integration, thus providing a decisive edge over WLAN hand-helds.



The working range of the snom m9 access point is roughly 50 meters indoors and approximately 300 meters outdoors (depending on the actual topology of a building and/or outdoor premise).

Equipment Contents

The m9 DECT phone is shipped with the following equipment and supplies:



1. DECT/GAP Base Station
2. DECT/GAP Handset
3. Handset Belt Clip
4. 3.7V Lithium-Ion Rechargeable Battery
5. Handset Charger
6. One CAT5 Ethernet cable
7. One Interchangeable Power Adapter for Base Station
8. One Power Adapter for Handset
9. Four Plug Adapters for Base Station
   - U.K. (three flat pins)
   - European (two round pins)
   - Australian (two flat pins)
   - U.S. (two flat pins)

SECTION I: Administrator Functions

Installation

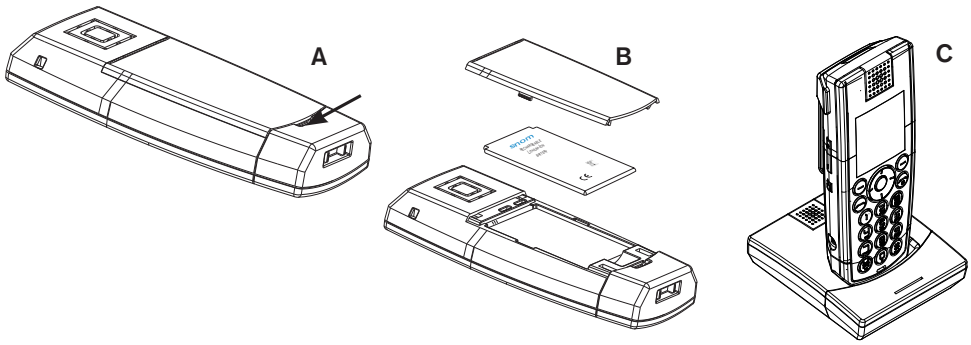
Warning: Use only the batteries approved by snom technology, as this may lead to leakage, fire, explosion, or other dangerous situations. Use the battery only for its intended purpose. Do not short-circuit the battery. Short-circuiting the terminals may damage the battery or the connecting object. Do NOT use a damaged charger or battery. Using a damaged battery may cause it to explode.

Handset Preparation

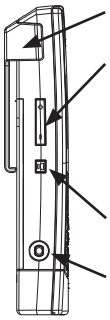
The base station, chargers, handsets, power adapters, and cables are designed for indoor installation with a temperature range between +5°C and 45°C (41°F and 113°F). **They are not intended for outdoor installation!**

1. Lift off the battery cover (image A).
2. Insert the battery pack with the electrodes in the top left corner. Replace the cover (image B).

   Note: Do not place or store the battery, whether inside or outside the handset, in the immediate vicinity of open fire or other heat sources. Leaving the battery in hot or cold places will reduce its capacity and lifetime. For short-term storage, store batteries in a dry location with low humidity, no corrosive gases, and at a temperature range of -20° C to 45° C (-4° F to 113° F). For long-term storage, store at temperature ranges between +10° C and +30° C (50° F to 86° F).
3. Connect the 5.9 V power supply of the charger to the wall outlet, then connect it to the charger.
4. Place the handset into the charging cradle (image C).



Handset Overview



Belt clip

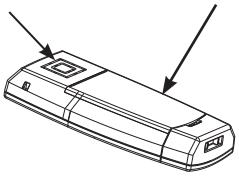
Volume adjust key+-

Adjust volume of:

- *Ringer (when call is ringing)*
- *Speaker (when in call)*

Speakerphone key *(on/off)*

Headset jack connector *2.5 mm*



Speakerphone

Battery cover

Recharging the Battery

The handset is powered by a rechargeable battery. The full performance of a new battery is achieved only after two or three complete charge and discharge cycles. The battery will eventually wear out even though it can be charged and discharged hundreds of times. If the phone is left unused, a fully charged battery will lose its charge over time. If the battery is completely discharged, it may take a few minutes before the charging indicator appears on the display.

Charge batteries within an ambient temperature range of 0° C to 40° C (32° F to 104° F). A device with a hot or cold battery may temporarily be non-working, even when the battery is fully charged. Avoid overcharging. Repeated overcharging can lead to deterioration in battery performance. Never attempt to charge the battery with reversed polarity as this may cause the gas pressure inside the battery to rise and lead to leakages.

Setting up the Base Station

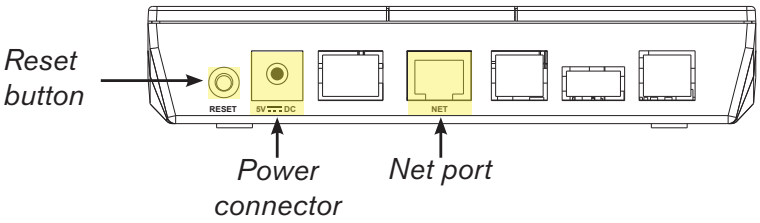
The base station and handsets are designed for indoor installation with a temperature range between +5°C and +45°C (between 41°F and 113°F). **They are not intended for outdoor installation!**

DECT handsets have a range of around 300 feet from the base station.

1. Once the handset is ready for use, insert one end of the Ethernet cable into the redundant network port of the base station, then connect the other end of the Ethernet cable to a LAN port in your network (e.g., switch, router, etc.).

> **Warning:** Safety status of input/output connections comply to safety extra-low voltage (SELV) requirements. To avoid electric shock, do not connect SELV circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and PSTN ports contain TNV circuits. Some LAN and PSTN ports both use RJ-45 (8P8C) connectors. Use caution when connecting cables.

2. Connect the 5V power converter to the wall outlet first, THEN to the base station.



The power indicator lights and the base station begins to initialize.

3. Once the base station has booted up, the **Call** LED on the face of the base station will begin blinking, indicating that the base station is waiting for a handset registration.

Finding the IP Address of the Base Station

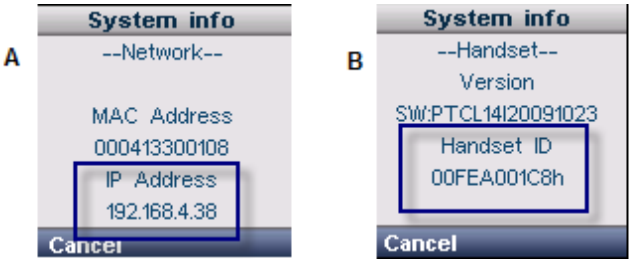
You can get the IP address of the base station either from the handset itself or via HTTP.

Handset

1. Press the center navigation button, followed by → **System Info**, then **OK.**

   The IP address of the base station is displayed on the screen. Make a note of it (image A below).

2. Using the bottom edge of the navigation wheel, page down twice. Make a note of the handset ID (image B). Do not include the "h."



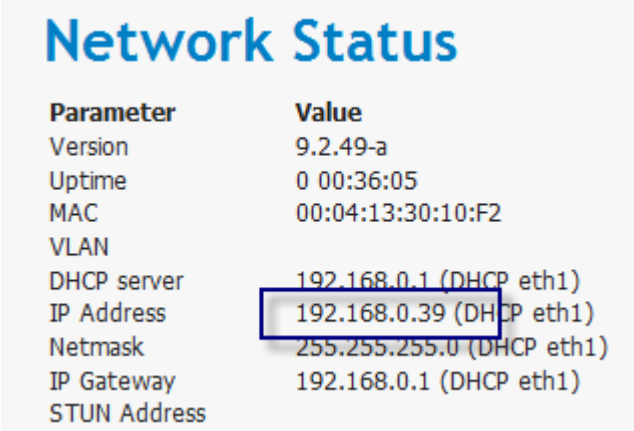
Note: If DHCP failed, the IP address, netmask, and IP gateway of the base station will need to be assigned from the handset. To apply the settings, the base must be rebooted. After reboot, the base should be reachable at the IP address assigned through the handset.

HTTP

HTTP allows you to access the m9 base station without looking at the handset. This is helpful in cases where the handset has problems registering to the base station or when the handset is simply not available.

Note: The steps described here assume that you have an operating system that supports IPv6 (Windows 7, Vista, Mac, Linux) and the device is in the same LAN as the computer being used to access it.

1. Find the MAC address of the base. The MAC address of the base station can be found on the label at the back of the m9 base station. For example, a MAC address could be 00:04:13:30:12:34.
2. Open a web browser and enter the following address: `http://[fe80::204:13ff:fe30:1234]`, where the `1234` corresponds to the last four digits of the MAC address from Step 1. You should see the login screen of the m9.
3. Log in using the default username and password (`admin` and `password`).
4. Navigate to the status web page. The IP address of the phone is listed as shown below.



Network Status

Parameter	Value
Version	9.2.49-a
Uptime	0 00:36:05
MAC	00:04:13:30:10:F2
VLAN	
DHCP server	192.168.0.1 (DHCP eth1)
IP Address	192.168.0.39 (DHCP eth1)
Netmask	255.255.255.0 (DHCP eth1)
IP Gateway	192.168.0.1 (DHCP eth1)
STUN Address	

Note: The IPv6 interface requires an upgraded Linux Kernel on the device. If the IPv6 interface is not working, upgrade the device to the latest Linux Kernel which can be found at http://provisioning.snom.com/download/fw/m9-os.bin.

Setting up the Handsets for Use

Registering the Handsets to the Base

1. Press (red phone key). The display will say "Searching for Base." Once the handset has found the base station, it will display the PIN prompt.
2. Enter the default PIN of `0000`.
3. Press OK.

Note: If the handset fails to register automatically, a manual registration can also be performed. Instructions are as follows:

1. Press the center navigation button, followed by ⚙ → **Handset** → **Register handset** → **Base 1**.
2. Enter your PIN, and press OK to register the handset.

Once the handset has registered with the base, the idle screen is displayed.

4. Repeat these steps for each handset.

Setting the Server Type

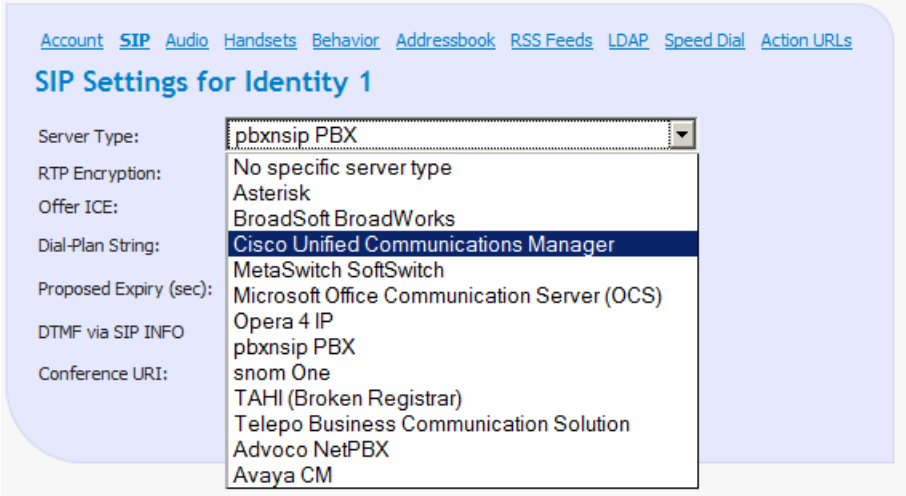
This section allows you how to set the server type and specify SIP settings (instructions for Microsoft® Lync 2010 are also provided).

1. From the m9 web interface, click **SIP** from the top navigation bar:

2. Configure the settings as detailed below:
   - Server Type: Server profiles provide support for non-standard functionality of some of the most popular VoIP platforms in the market, enabling snom m9 product ease of use and integration with third-party IPBXs. Server-type supported platforms include:

Microsoft Lync 2010	Asterisk	Telepo BCS
Cisco Call Manager	snom ONE	Advoco NetPBX
Broadsoft	Metaswitch	Avaya CM

Note: **TAHI (Broken Register)** performs the same function as Broken Registrar on the snom 3xx.



- RTP Encryption: Enables media encryption on the m9 (toggles between SAVP/AVP). Enable this setting if Media Encryption (SRTP) functionality is desired
- Offer ICE: Allows the snom m9 to offer ICE candidates for outgoing calls (Microsoft Lync functionality)
- Dial Plan String: See "Dial Plans" on page 35.
- Proposed Expiry (sec): SIP registration expiry in seconds.
- DTMF via SIP INFO: Enables DTMF for IVR function with SIP INFO method.
- Conference URI: URI for server hosted call conference.

3. Click **Save**.

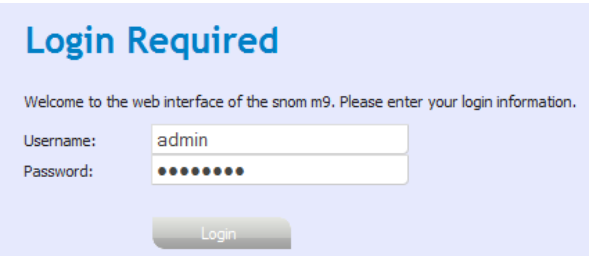
Assigning Handsets to Extensions

This section shows you how to register an extension to the m9 handset (instructions for Microsoft® Lync 2010 are also provided). Registering a handset to an extension is done from the m9 web interface. To access the interface, the IP address of the base station is required (see Page 5).

1. Enter the base station's web interface by opening a browser window and entering the IP address of the base station (e.g., `http://192.168.4.38`), then press Enter.
2. Log in using the default login credentials:

   Default user name: `admin`

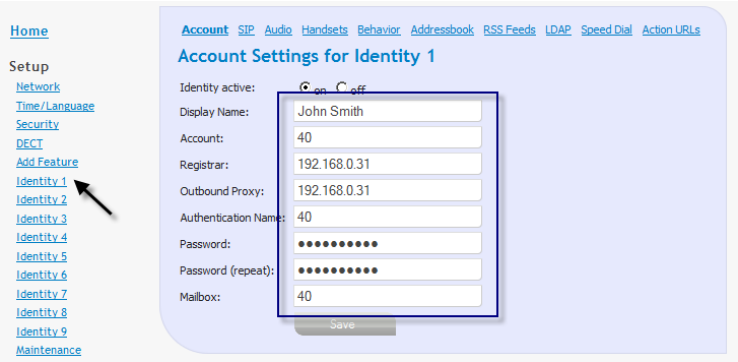
   Default password: `password`



Important: The device will be inaccessible if both the DECT PIN and the Web portal password of the snom m9 are forgotten. Under these circumstances, the base station can be reverted back to factory default by dialing the recovery code `**0000**` from any registered handset.

3. Click **Identity 1** from the left navigation panel, and configure the following parameters (see next page).

   Note: An Identity on the device corresponds to a single a user. Each identity provides its own preferences and behavior desired by the individual user.



- Identity active: Set to **on**.
- Display Name: This name will be displayed on the handset, e.g., `John Smith`.
- Account: PBX extension number.
- Registrar: IP address or domain name of the PBX.
- Outbound Proxy: IP address or domain name of the PBX. When using a domain name, prefix the domain name with `sip:` (e.g., `sip:mycompany.com`).
- Authentication Name: If no authentication name is provided, the Account setting is used.
- Password: Use the SIP password that belongs with the extension that was configured in the IPBX or SIP server.

Microsoft® Lync 2010 Integration

Disclaimer: The Microsoft Lync 2010 Server functionality of the snom m9 is still under development, and snom cannot guarantee functionality in all user environments.

- Identity active: Set to **on**.
- Display Name: This name will be displayed on the handset, e.g., `John Smith`
- Account: The user's OCS usermame, e.g., `John.Smith`.
- Registrar: The OCS domain, e.g., `company.com`.
- Outbound Proxy: The server address, e.g., `sip:ocs.company.com`

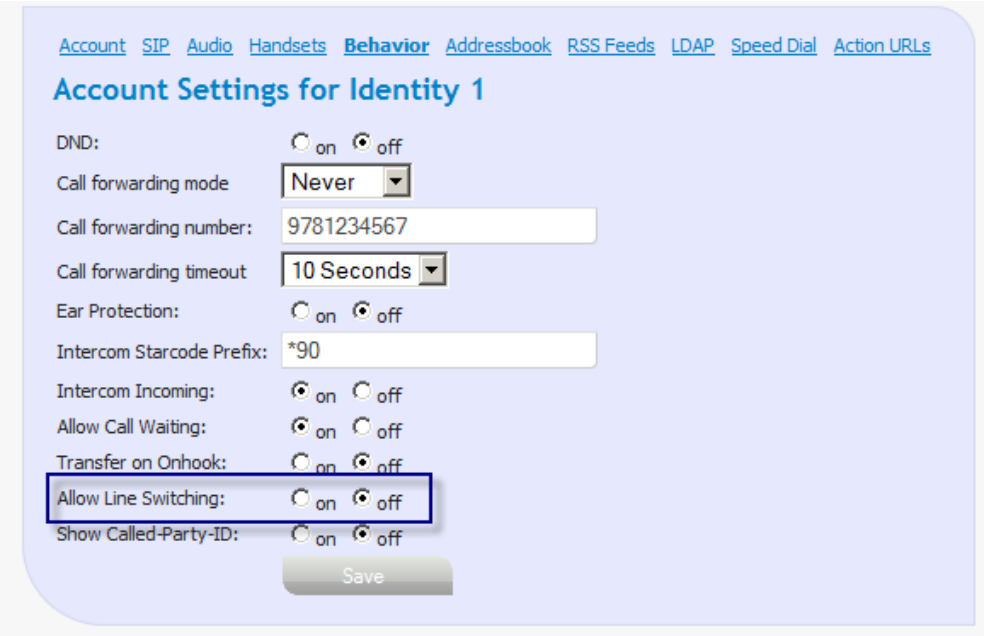
  Note: It is also possible to specify the port and transport layer: e.g.,
  `sip:ocs.company.com:5060;transport=tcp` (Use TCP/Port 5060)
  `sip:ocs.company.com:5061;transport=tls` (Use TLS/Port 5061)
- Authentication Name: Domain name\account name (e.g., `mycompany\John.Smith`).
- Password: Use the password that belongs with the extension.

4. Click **Handsets**, then select the handset ID from the **Handset ID (IPUI)** dropdown list. Click **Save**.

The user's name will be displayed on the phone display. This is considered the "idle display."

5. Repeat these steps for each handset.

Note: Each handset can be assigned up to nine SIP accounts (identities). When there is only one handset per account, that handset will use the same account for incoming and outgoing calls. When one handset has been assigned to multiple accounts, the same handset will ring whenever a call comes in on any of the SIP accounts for incoming calls. For outgoing calls, the user will need to select the Outgoing SIP account by using the "Allow Line Switching" setting (shown below), which allows users to call numbers with an <index>*Number format (e.g., to call 499 from Identity 3, the user will dial 3*499).



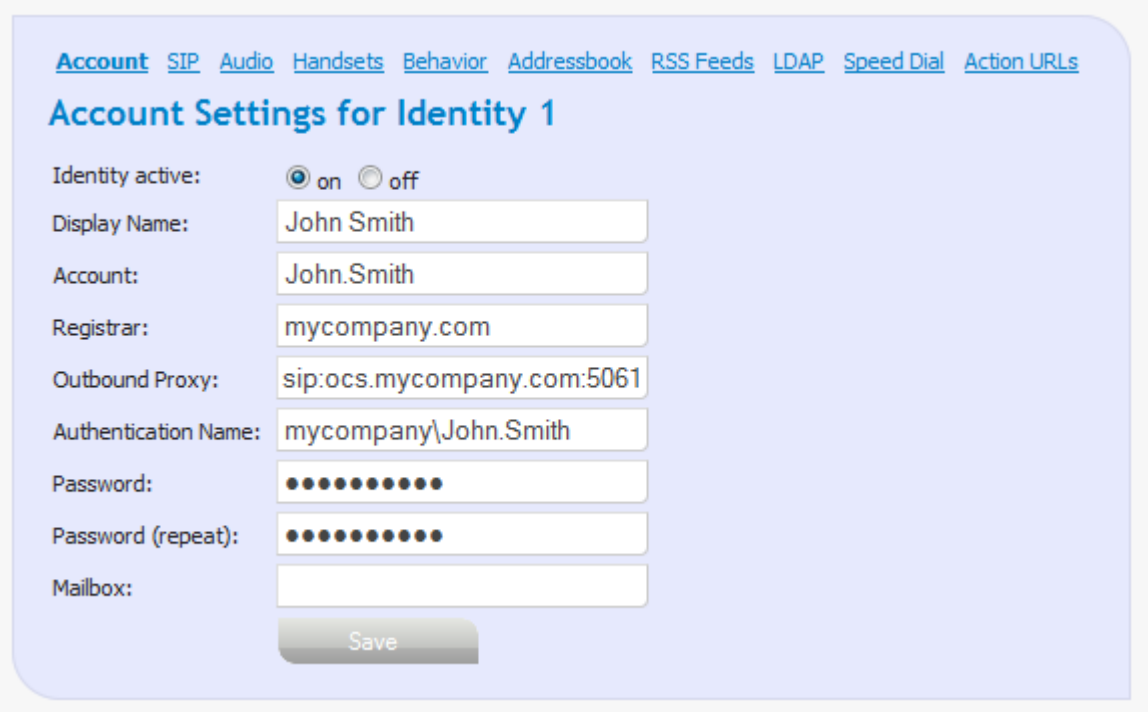
Verifying the Registration(s)

1. Log in to the m9 web interface, and click the Status from the left navigation bar.
2. Click **Registration**. A **200 Ok** indicates a successful registration. The "(90 s)," as shown in the image below, indicates that the registration will be complete in 90 seconds. Other possible values include "408 Timeout," which indicates the user could not be found in time, and "409 Authentication Required," which indicates a password issue.

Example Setups

Single SIP Account with Multiple Handsets

1. Configure the SIP account on the base station as shown below:



2. Click the **Handsets** tab, and assign all registered handsets to the Identity.

Each handset should reflect the display name (or username) of the configured account.

Incoming calls to the SIP account will alert all handsets, and outgoing calls can be placed from any handset.

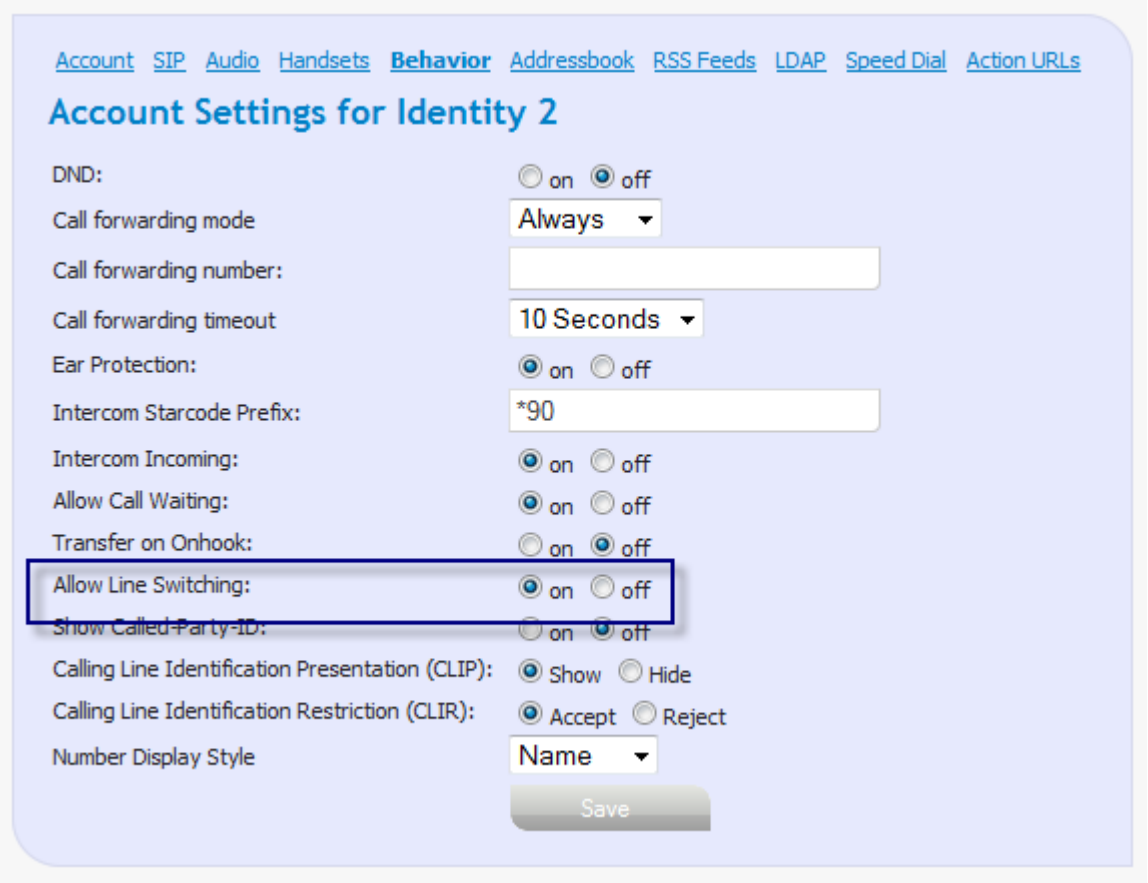
Multiple SIP Accounts with a Single Handset

1. Use Identity 1-9 for configuring all available SIP accounts one by one on the base station as shown below:

2. Click the **Handsets** tab of each Identity and assign the registered handset to the Identity.

   Each Identity should have the same Handset IPUI assigned to it.

3. Click the **Behavior** tab of each Identity, and set the **Allow Line Switching** setting to **on** as shown below:



The handset displays the display name/username of the first registered Identity in order of priority 1-9.

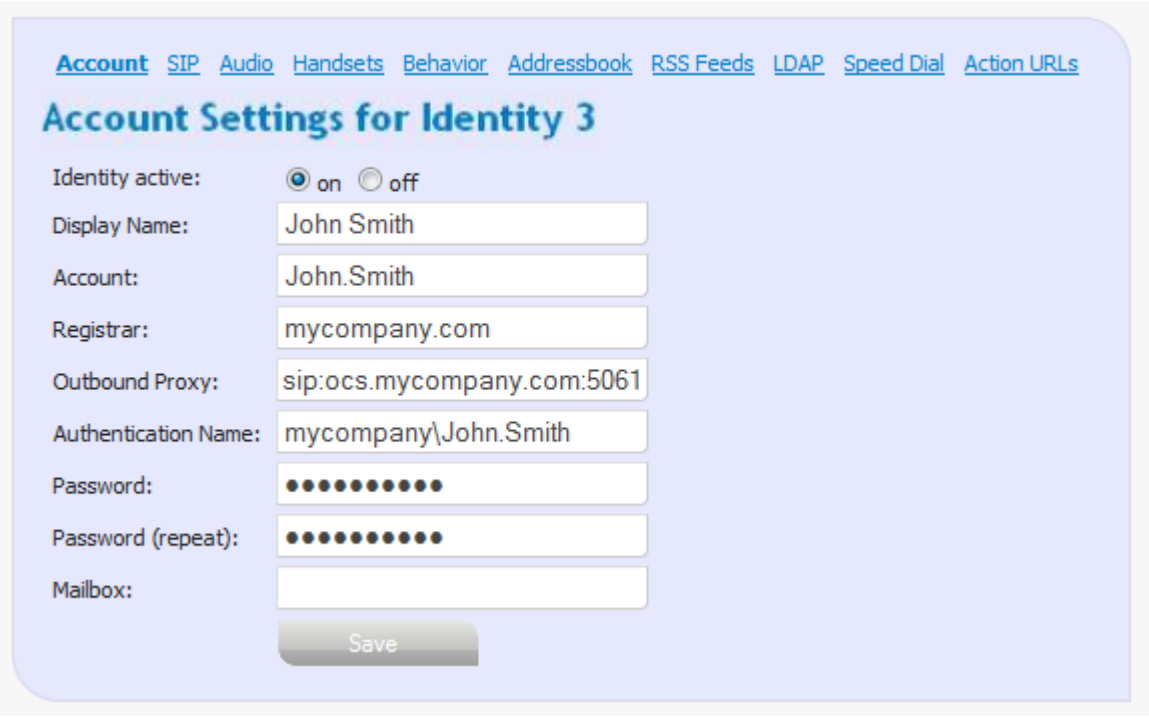
Incoming calls to any of the configured SIP accounts will alert the handset.

For outgoing calls, use the dial format of <Identity Index> * <Number> for selecting an outgoing line:

```
For making a call to 1234 from Identity 1  → Dial 1*1234
For making a call to 956 from Identity 7   → Dial 7*956
For making a call to 4567 from the current Identity
```

Multiple SIP Accounts with Multiple Handsets

1. Use Identity 1-9 for configuring all available SIP accounts on the base station as shown below:



2. Click the **Handsets** tab of each Identity, and assign a unique handset IPUI to each Identity.

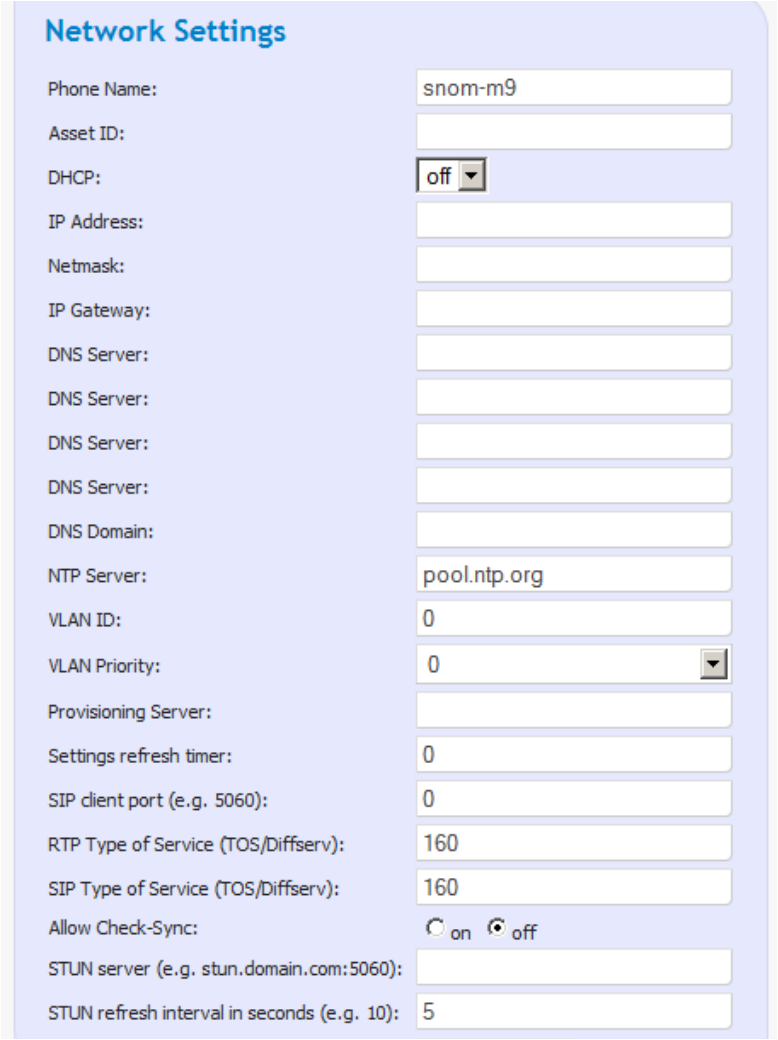
3. Each handset should reflect the display name/username of the Identity to which it has been assigned:

Incoming calls to any of the configured SIP accounts will alert the corresponding handset for that SIP account

Outgoing calls from a handset must be placed from the SIP account to which it has been assigned.

Network Settings

To specify the network settings for your system, click **Network** from the left navigation panel.



- Phone Name: This is the device “Network Host name” as seen in DHCP requests.
- Asset ID: This specifies the `llpd_asset_id` parameter.
- DHCP: The on/off options correspond to your network configuration (DHCP or static). Default is DHCP.
- IP Address: This is the static IP address of the device, if DHCP is switched off.

- Netmask: This is the netmask for the network, if DHCP is switched off.
- IP Gateway: This is the default gateway of the network, if DHCP is switched off.
- DNS Server: Multiple DNS servers can be used for DNS redundancy. If one of them fails, a backup will be available.
- DNS Domain: This is the DNS domain of the device, if DHCP is switched off.
- NTP Server: NTP Time Server IP Address of hostname.
- VLAN/ID: VLAN ID is the identification of the VLAN, which is basically used by the standard 802.1Q. It has 12 bits and allows the identification of 4096 VLANs. Possible values range from 0 to 4095.
- VLAN Priority: VLAN Priority lets the user assign a priority to outbound packets containing the specified VLAN-ID (VID). Possible values range from 0 to 7.
- Provisioning Server: This field takes an auto configuration URL (links to a configuration XML file)
- Settings refresh timer: This field indicates the number of seconds after which the m9 will refresh its settings from the setting server periodically (0 = don't refresh).
- SIP client port: Allows the m9 to bind the device to a fixed SIP UDP port (e.g., 5060). By default, the m9 selects a random UDP port for SIP signaling.
- RTP Type of Service (ToS/Diffserv): Enables the m9 to support quality of service (QoS) for RTP traffic in the network via Diffserv.
- SIP Type of Service (ToS/Diffserv): Enables the m9 to support quality of service (QoS) for SIP traffic in the network via Diffserv.
- Allow Check-Sync: Allows reboot/re-sync with SIP NOTIFY.
- STUN server: STUN (Simple Traversal of UDP through NAT) server and port.
- STUN refresh interval in seconds: Interval for STUN refresh.

NAT Traversal

NAT is typically used by a router or firewall to allow devices that are on a LAN (Local Area Network) and have private IP addresses to share a single, public IP address. To maintain the session, the NAT'ed snom m9 behind the firewall must keep sending messages to keep the session open. These messages are called "NAT Keep Alive" messages. The snom m9 provides the following provisionable settings for NAT Keep Alive:

- `outbound_method: crlf or stun`
- `outbound_tcp: Refresh interval in seconds for TCP connections (default is 60)`
- `outbound_udp: Refresh interval in seconds for UDP connections (default is 20)`

Security

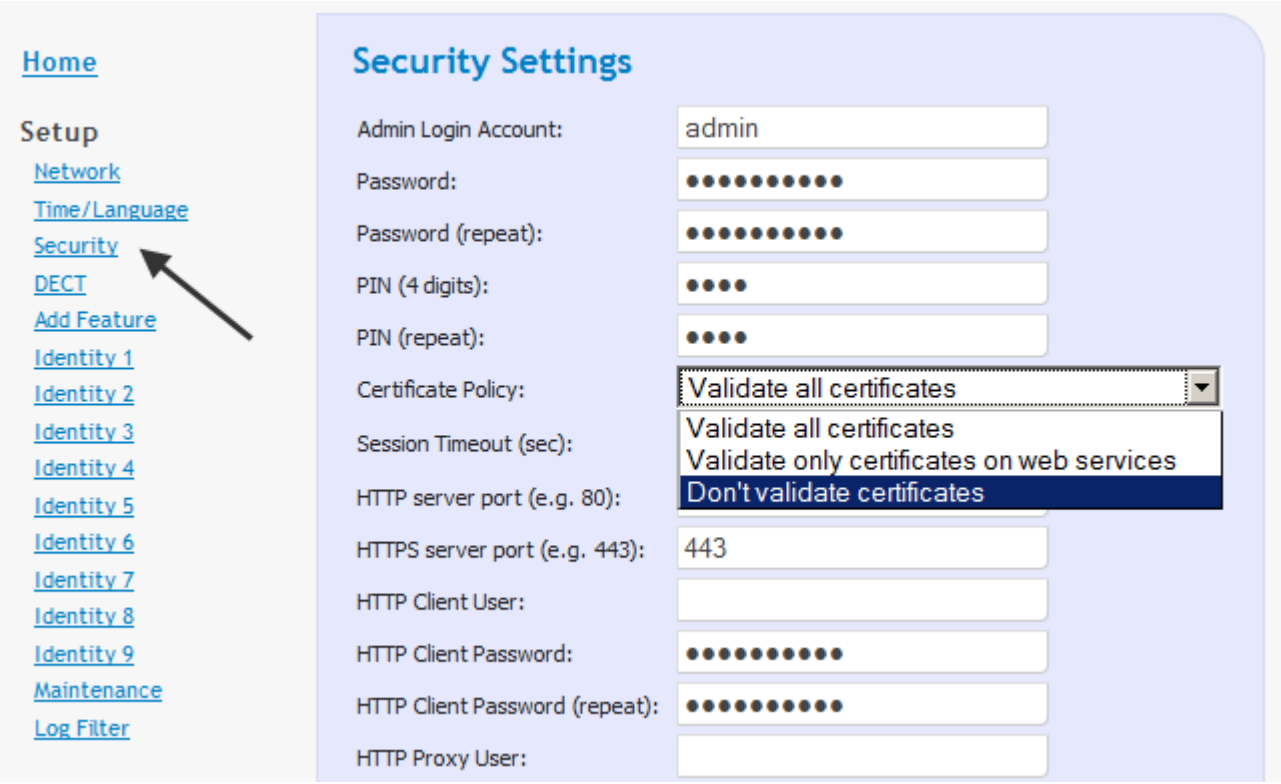
X.509 Certificates

In Cyberspace, “certificates” are electronic documents that use digital signatures to bind a public key with an identity and include information such as the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual, thus establishing the identity of the certificate owner. We are trying to verify that the device/ID is who they say they are, which is vital for plug and play when authenticating over the WAN.

Certificate Authorities

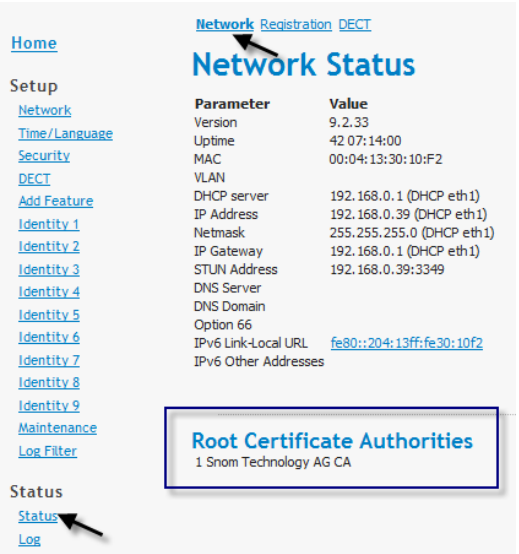
A certificate authority (CA) is an entity that issues digital certificates. It is a third party that is trusted by both the owner of the certificate and the party relying upon the certificate. The m9 phone has a built-in CA that is owned by snom.com. The IPBX software can use the certificate to be assured that it is talking to a snom m9 base station with MAC address 000413xxxxxxx. The m9 base station automatically performs server identity verification based on trusted X.509 certificate chains when SSL/TLS is used. Servers that present certificates signed by CAs unknown to the base are rejected. To deactivate the Server Verification functionality:

1. Log in to the m9 web interface, and select **Security**.
2. From the **Certificate Policy** dropdown, select **Don’t validate certificates**.



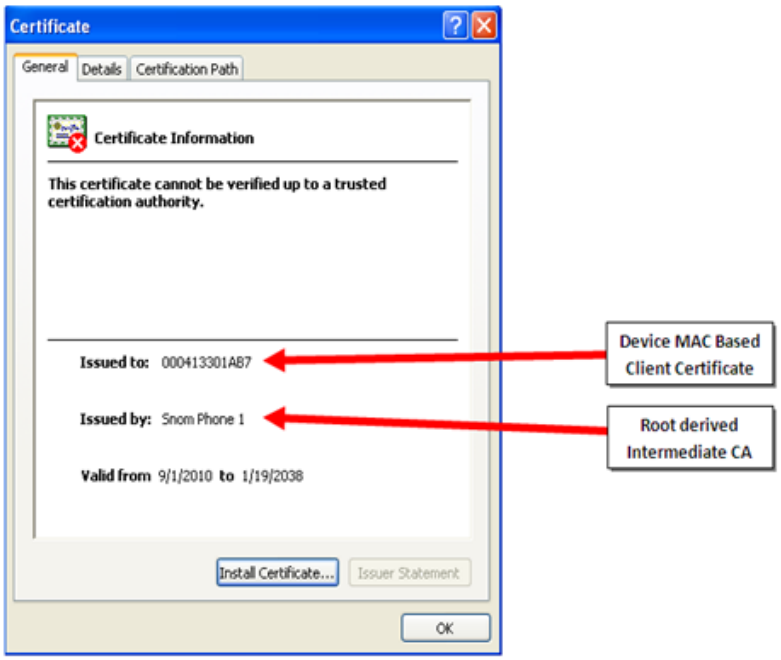
Note: The snom m9 is also able to present its X.509 Certificate for Client Identity Verification (CIV), a critical risk mitigation measure that gives all participants confidence about who they are dealing with. For the Client/Server verification to function, the validation server must have a valid certificate with a domain name as the CN. Also, the same domain name must be provided to the snom m9 as the SIP server or auto-configuration server.

To view the trusted root CAs on the base, click **Status** > **Network**.

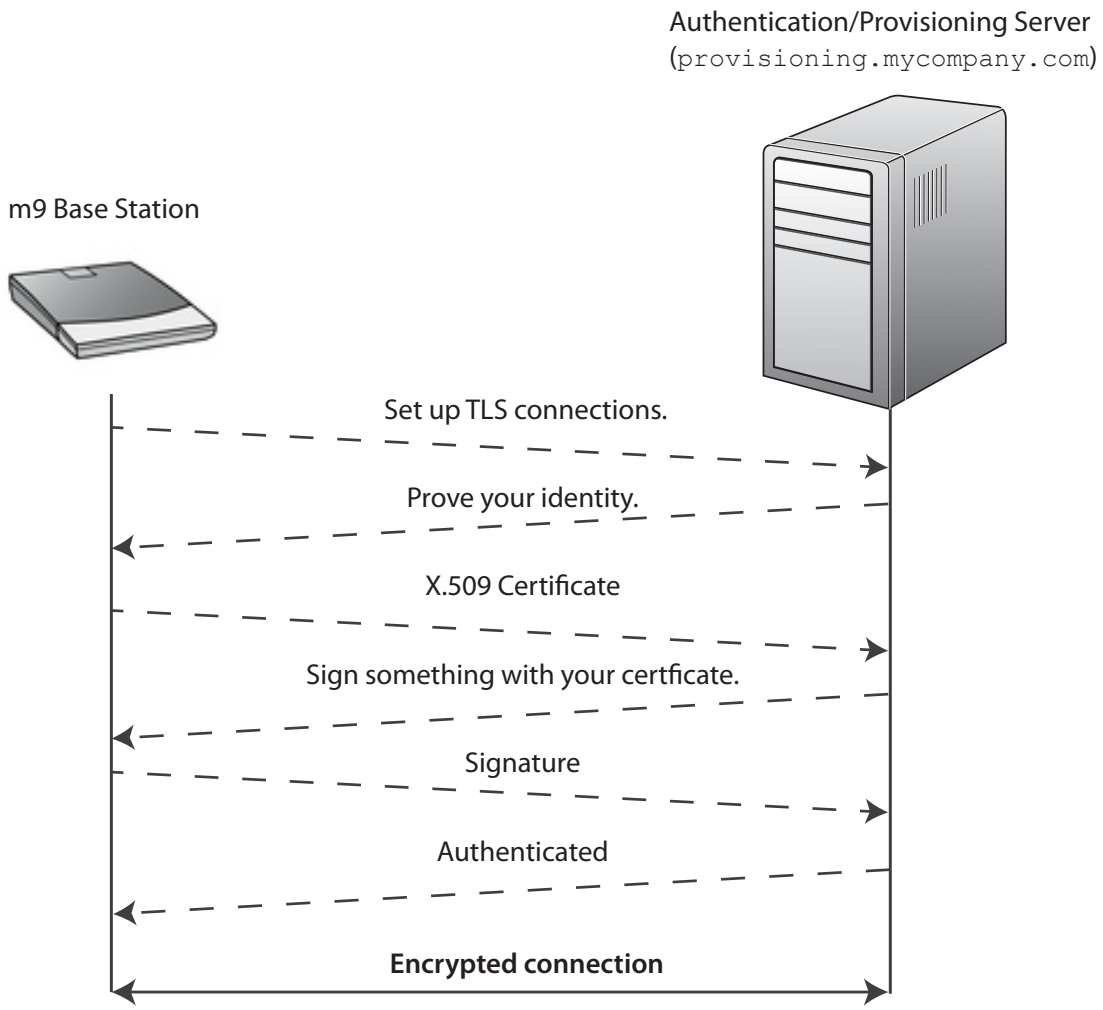


Client Certificates

Each snom m9 base station comes equipped with a unique X.509 certificate signed by snom CA.



These client certificates are used by the snom m9 to provide servers proof-of-identity based on the MAC address and to generate private-key-based signatures. Client certificates allow an SSL/TLS server to verify the identity of a connecting client. The verifying server can be co-located within a SIP server or a configuration server or it can be an independent network entity. This mechanism of identity verification also eliminates the need for standard authentication mechanisms such as username/password authentication



The client certificate of the snom m9 can also be customized by provisioning a custom client certificate/private key. To provision a customized client certificate and private key to the snom m9, encapsulate the <cert> and <key> tags within a <certificates> XML tag as shown below:

```
<?xml version="1.0" encoding="utf-8"?>
<certificates>
  <cert>
     -----BEGIN CERTIFICATE-----
     MIICezCCAeQCAQEwDQYJKoZIhvcNAQEFBQAwgYUxCzAJBgNVBAYTAkRFMQ8wDQYD
     VQQIEwZCZXJsaW4xDzANBgNVBAcTBkJlcmxpbjEbMBkGA1UEChMSU25vbSBUZWNo
     bm9sb2d5IEFHMRUwEwYDVQQDEwxTbm9tIFBob251IDExIDAeBgkqhkiG9w0BCQEW
     EXN1Y3VyaXR5QHNub2OuY29tMB4XDTA5MDkxNDEyMDc1NFoXDTM4MDExODIzNTk1
     OVowgYUxCzAJBgNVBAYTAkRFMRUwEwYDVQQDEwwwMDAOMTMzMDAzMTkxDzANBgNV
     BAcTBkJlcmxpbjEbMBkGA1UEChMSU25vbSBUZWNobm9sb2d5IEFHMQ8wDQYDVQQI
     EwZCZXJsaW4xIDAeBgkqhkiG9w0BCQEWEXN1Y3VyaXR5QHNub2OuY29tMIGfMA0G
     CSqGSIb3DQEBAQUAA4GNADCBiQKBgQC92A7IOyixUlHHQgVpUrn1RqhXOA0eEM3B
     /VkSK15id2j4wIHT5dbX1P9GE7G12bRHU4Vrx3oQtfGIR5Ktt5LDJjVedxDMKuNM
     +JN/AFNrdRR5dtyMSebsMsheB8X9vrrfToipRogvksF5LBm+eVySrUHsULpwlCfR
     dCV7Cp/ehCveZKVwr5Xz
     -----END CERTIFICATE-----
  </cert>
  <key>
     -----BEGIN RSA PRIVATE KEY-----
     MIICXAIBAAKBgQC92A7IOyixUlHHQgVpUrn1RqhXOA0eEM3B/bynjcaRGkAX6F1q
     LZwaWP/7VZ9M9GhJzzCFoOG9JpOaUM1P+v5087ZAzJJsbfSjn6i3V/2CFqiK8E1g
     y3nZ3us24hQRYcK36fUKvZd+LxCLP1DMMQwICSs7WspDETZHA1LQ+Rj5gQIDAQAB
     AoGAEumwZ19qAWhjDOfLhDeioQXeBYmL1QA1j2r43XRpYNFNq1QR4l8S2ykcr2xT
     R3Zd4WSLv/RMKOzr7Ya414f4y3/6Mopmf8YB11ZGLrsC6YvGZv8c682rNajpsPXH
     rz+7xDPQ/kKQNrEPMt4W6gB4kHW1Lkq1Uyv62xm3ChRL6jECQQD1drfMB/O3uPIc
     nRhIVDwy16TOVukmBTOCQE9F/HFbkKPLcgtF+/rXMNvpqFY6mYtn6elvA1sCRZ14
     uoVaFESxNNcTDc9SbM34qXerWN8PjyiylpkPjAXfD1A=
     -----END RSA PRIVATE KEY-----
  </key>
</certificates>
```

Custom client certificate

Custom private key

Certificate Authority (CA) Setup

To auto-provision trusted root CAs to the m9 base, enclose each trusted root CA within a `<ca>` tag as shown below:

```
<?xml version="1.0" encoding="utf-8"?>
<certificates>
 <ca>
  -----BEGIN CERTIFICATE-----
  MIIFLDCCBBSgAwIBAgIEOU99hzANBgkqhkiG9w0BAQUFADBaMQswCQYDVQQGEwJX
  VzESMBAGA1UEChMJYmVUU1VTVGVkMRswGQYDVQQDExJiZVRSVVNUZWQgUm9vdCBD
  QXMxGjAYBgNVBAMTEWJ1VFJVU1R1ZCBSb290IENBMB4XDTAwMDYyMDEOMjEwNFoX
  DTEwMDYyMDEzMjEwNFowWjELMAkGA1UEBhMCV1cxEjAQBgNVBAoTCWJ1VFJVU1R1
  ZDEbMBkGA1UEAxMSYmVUU1VTVGVkIFJvb3QgQOFzMRowGAYDVQQDExFiZVRSVVNU
  ZWQgUm9vdCBDQTCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBANSOc3oT
  CjhVAb6JVuGUntS+WutKNHUbYSnE4aOIYCF4SP+OOPpeQY1hRIfo7c1Y+vyTmt9P
  6j41ffqzeubx181vSUs9Tv1uDoM6GHh3o8/n9E1z2Jo7Gh2+1VPPIJfCzz4kUmwM
  mlWXKWWuGVU1BXJHO+gY3LjprONzARJOo+FcXxVdJPP55PS2Z2cS52QiivalQaYc
  tmBjRYoQtLpGEK5BV2VsPyMQPyEQWbfkQNOmDCP2qq4=
  -----END CERTIFICATE-----
 </ca>
 <ca>
  -----BEGIN CERTIFICATE-----
  MIIEKjCCAxKgAwIBAgIQYAGXtOan6rSOmtZLL/eQ+zANBgkqhkiG9w0BAQsFADCB
  rjELMAkGA1UEBhMCVVMxFTATBgNVBAoTDHRoYXdOZSwgSW5jLjEoMCYGA1UECxMf
  Q2VydGlmaWNhdGlvbiBTZXJ2aWNlcyBEaXZpc2lvbjE4MDYGA1UECxMvKGMpIDIw
  MDggdGhhd3R1LCBJbmMuICOgRm9yIGF1dGhvcm16ZWQgdXN1IG9ubHkxJDAiBgNV
  BAMTG3RoYXdOZSBQcm1tYXJ5IFJvb3QgQOEgLSBHMzAeFwOwODAOMDIwMDAwMDBa
  FwOzNzEyMDEyMzU5NT1aMIGuMQswCQYDVQQGEwJVUzEVMBMGA1UEChMMdGhhd3R1
  LCBJbmMuMSgwJgYDVQQLEx9DZXJOaWZpY2FOaW9uIFN1cnZpY2VzIERpdm1zaW9u
  MTgwNgYDVQQLEy8oYykgMjAwOCBOaGF3dGUsIE1uYy4gLSBGb3IgYXVOaG9yaXp1
  ZCB1c2Ugb25seTEkMCIGA1UEAxMbdGhhd3R1IFByaW1hcnkgUm9vdCBDQSAtIEcz
  t8jLZ8HJnBoYuMTDSQPxYA5QzUbF83d597YV4Djbxy8ooAw/dyZO2SUS2jHaGh7c
  KUGRIjxpp7sC8rZcJwOJ9Abqm+RyguOhCcHpABnTPtRwa7pxpqpYrvS76Wy274fM
  m7v/OeZWYdMKp8RcTGB7BXcmer/YB1IsYvdwY9k5vG8cwnncdimvzsUsZAReiDZu
  MdRAGmIONj81Aa6sY6A=
  -----END CERTIFICATE-----
 </ca>
</certificates>
```

Custom CA 1

Custom CA 2

Encrypted Calls

The snom m9 supports media and SIP signaling encryption for making secure VoIP calls using TLS/SRTP. These features are provided via RFC 4346 (TLS), RFC 3711 (SRTP), and Internet draft draft-ietf-mmusic-sdescriptions-12 (SDP Security Descriptions for Media Streams)

Signaling Encryption

Transport Layer Security or TLS is a cryptographic protocol that provides communications security over the Internet. TLS enables a device and server to use a secure connection for communication which is not susceptible to eavesdropping or data thefts on the Internet. TLS is analogous to HTTPS.

The snom m9 provides the user with the option to use TLS functionality for SIP signaling (also known as SIPS), thereby providing a high level of call control security on the Internet as well as in other security-sensitive networks. The TLS/SIPS functionality can be enabled on the snom m9 by appending the `transport=tls` parameter to the SIP outbound proxy. E.g. the following Outbound Proxy setting would enable the snom m9 to use TLS (port 5061) for registration and call setup with `sip:myserver.com`.

Outbound Proxy: `sip:myserver.com:5061;transport=tls`

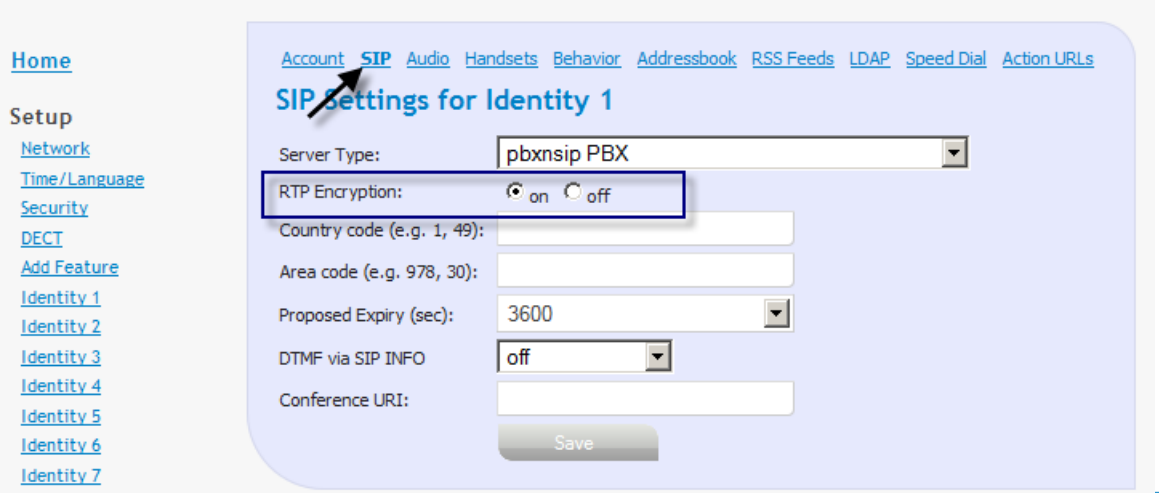
Note: TLS usage can also be configured via DNS SRV setup. In this case, the snom m9 will automatically select the port and transport provided by DNS SRV lookup.

This signaling is used between the base station and the IPBX, so it must also support these protocols to protect the conversation between the base station and the handset.

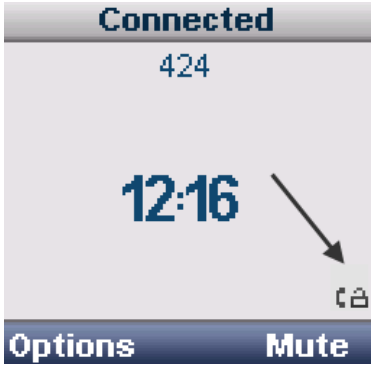
Media Encryption

For media encryption, the snom m9 relies on RFC 3711 (SRTP) for Packet Encryption and Internet draft draft-ietf-mmusic-sdescriptions-12 for Key Exchange. The Key Exchange protocol allows the snom m9 to exchange RTP Keying information with its peer in SIP signaling messages when a call is placed or answered. This exchanged information is then used to establish an “encrypted” audio stream between the snom m9 and its peer.

Media encryption can be switched on using the **RTP Encryption** setting. This setting toggles between SAVP/AVP). In summary, TLS encrypts the signalling or call setup and teardown messages, and SRTP encrypts and protects the audio steam or voice packets.

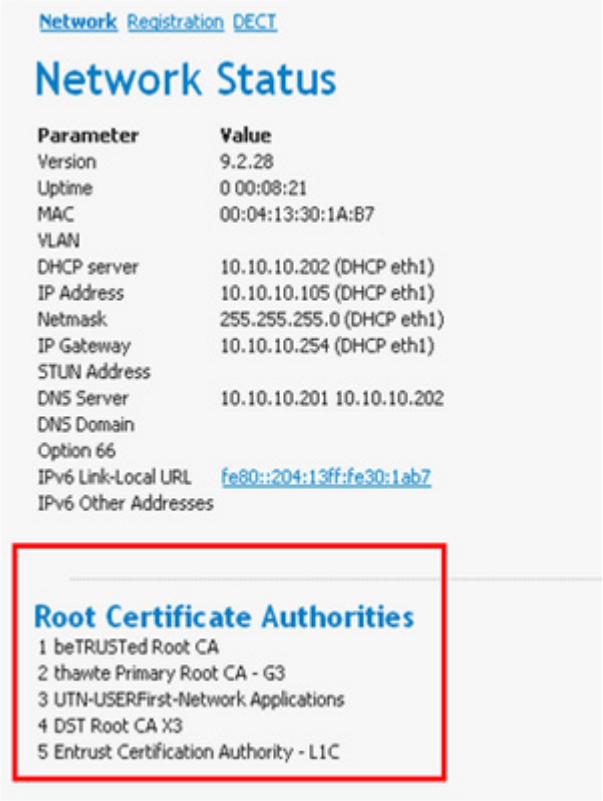


Secure call status is indicated on the snom m9 handset. If the phone successfully registered a TLS/SRTP session, the closed padlock icon will be displayed.



Certificate Authority Setup

Custom configured CAs can be viewed by clicking **Status** > **Network** > **Root Certificate Authorities** from the snom m9 web interface. (Additional CAs can be added, but you cannot delete select CAs. However, doing a factory reset from the base will clear all the configured CAs.)

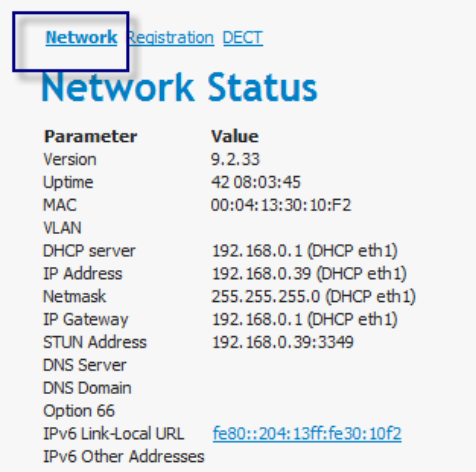


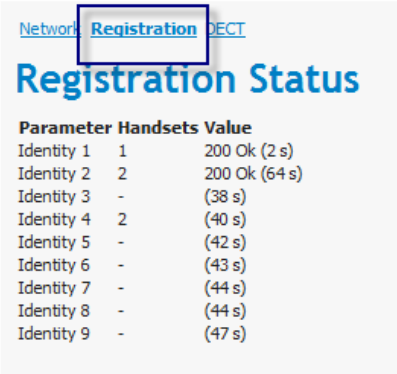
System Status

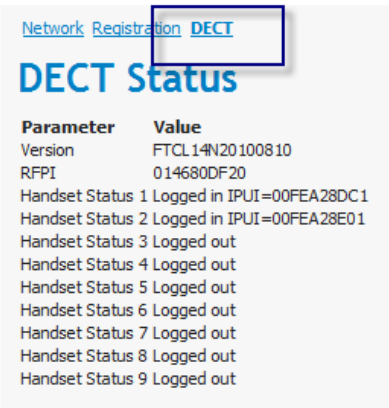
You can see what's going on in the system and with the handsets using the Status links in the left navigation panel of the m9 web interface, as shown below (once logged into the base station).

Status of System

The **Status** link gives you the status of the network, including the IP address information. The registrations show the registration status of each identity, and the DECT link shows the status of each DECT handset.







The system's information is also available from the handset:

1. Press the center navigation button, followed by ⚙ → **Handset** → **System Info.**
2. Page through the different screens using the bottom edge of the navigation wheel.

   The Network page displays the MAC and IP addresses of the base station, the Gateway page displays the firmware version, and the Handset page displays the identification number of the handset.

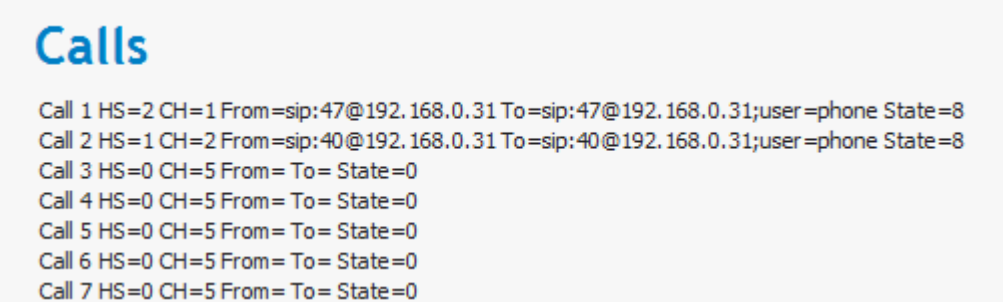
Logging

The **Log** link gives you the SIP logging messages. Following are a few types:

- Registration Log
- Roaming Provisioning
- Location Profile

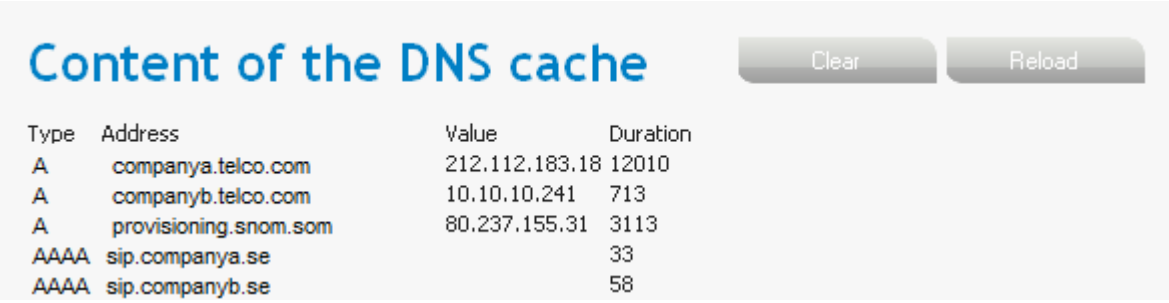
Calls

The **Calls** link indicates the status of active calls on the snom m9 base station. *Reminder*: You can have only four active calls on one base station.



DNS Cache

DNS is used to MAP IP addresses to domain names. To reduce DNS traffic across the network and increase performance, snom m9 stores DNS query results for a period of time. The contents of the DNS cache, which is typically the IP address of the SIP server or IPBX, can be viewed under this section.



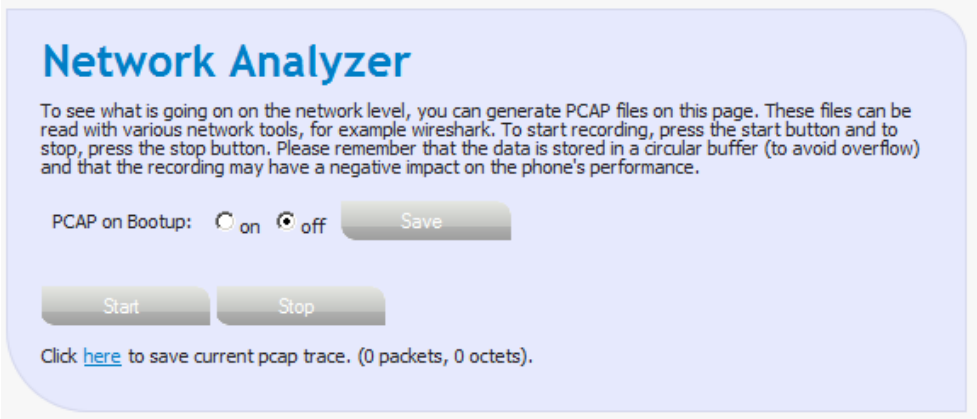
Network Analyzer

The network analyzer allows administrators to capture network traffic on the snom m9 base station. Captured files can be viewed in packet capture tools such as Wireshark, which is a free open source packet-capturing and analysis tool (www.wireshark.org). You would use this for troubleshooting network or call quality issues.

1. In order to manually capture traffic on the snom m9, click the **Start** button.

   Note: The **PCAP on Bootup** function automatically turns on packet capture on bootup.

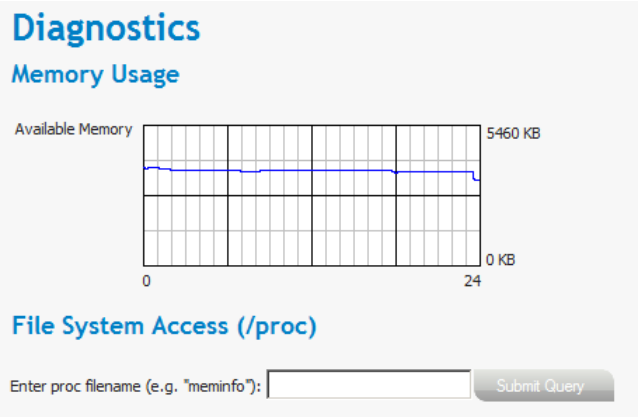
2. After the desired amount of time, click the **Stop** button to end the packet capturing.



3. To open the capture file in a packet capturing tool, click the **here** link at the bottom of the Network Analyzer page.

Diagnostics

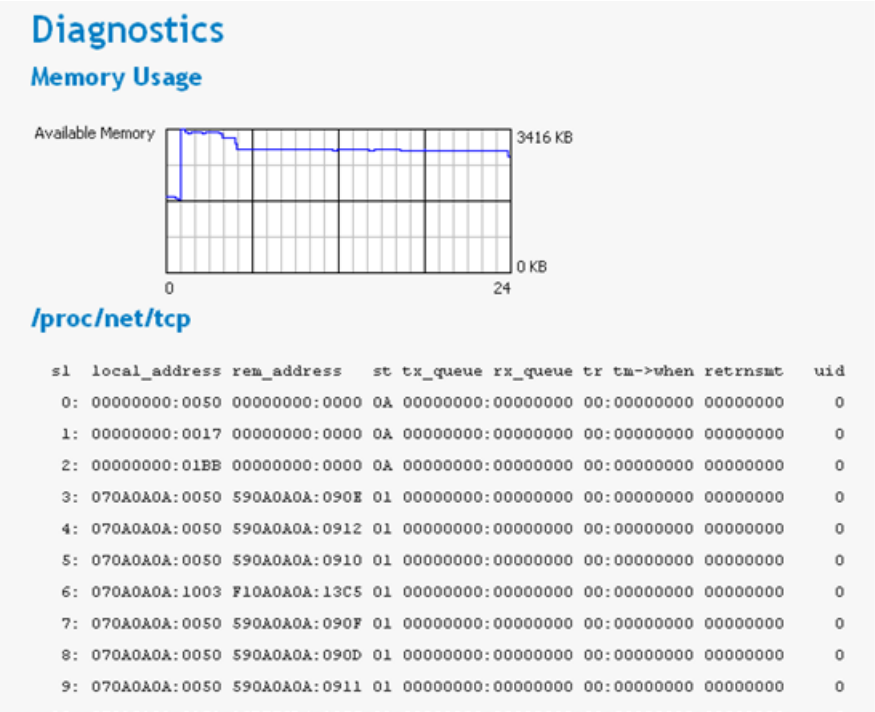
The **Diagnostics** link displays memory usage.



It also provides access to the Linux `/proc` folder for checking version, uptime, sockets, etc. For example, you can view the current open TCP sockets on a device by doing the following:

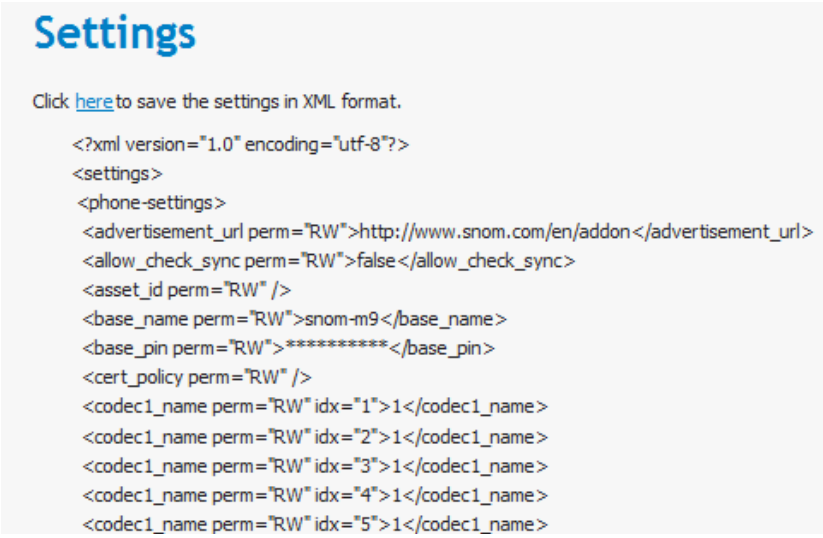
1. Enter `net/tcp` into the input box.
2. Click **Submit Query**.

The open TCP sockets are listed as shown below:



Settings

The **Settings** page lists the setting and configuration parameters of the snom m9 base station. Settings can be stored as an XML file and exported for duplication/provisioning.

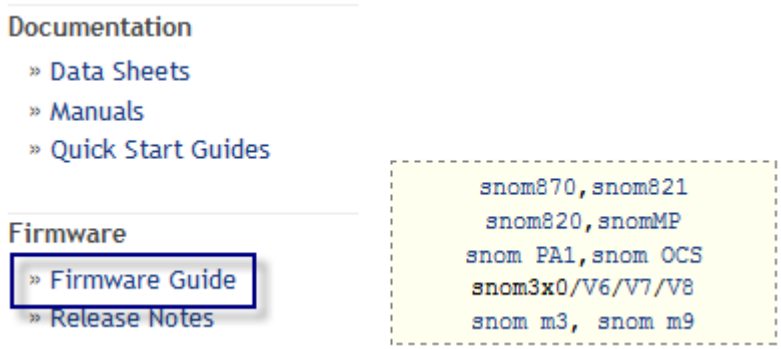


Base Station Firmware Update.

HTTP Firmware Update

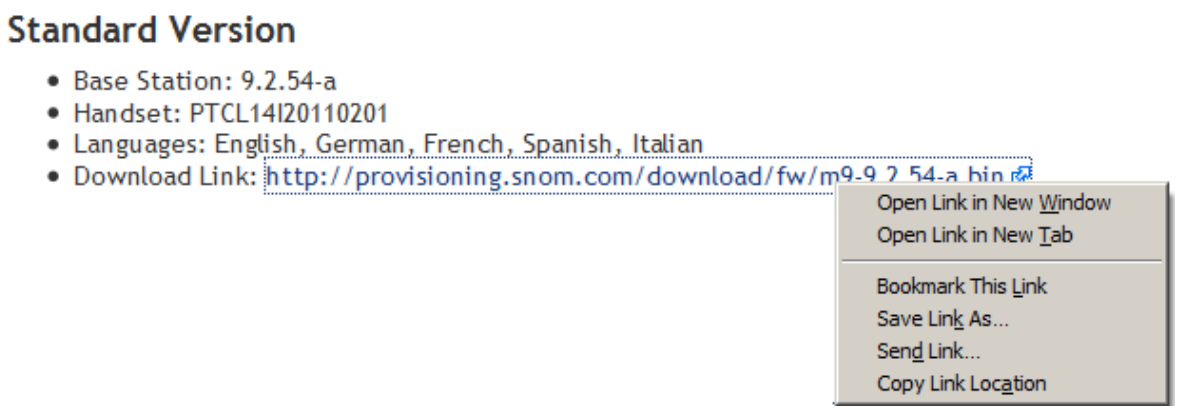
Before you can update the firmware from the m9 web interface, you will need to retrieve the software from the snom wiki (provisioning.snom.com).

1. Go to `http://wiki.snom.com` and click **Firmware Guide** as shown below:

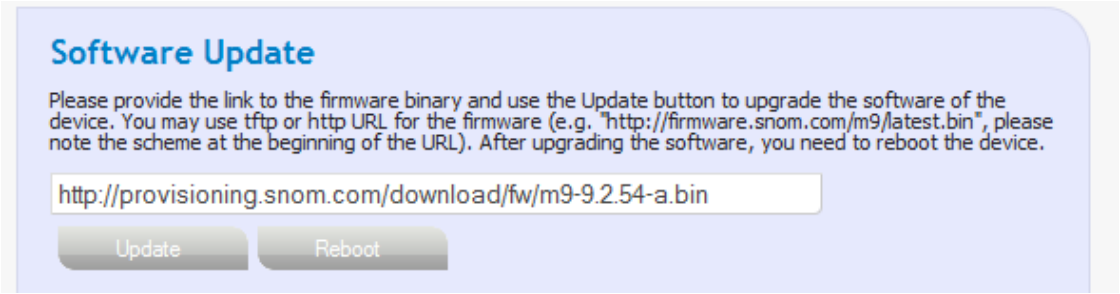


2. Click your phone model, then click the firmware version.

3. Right-click the link and copy the link location.

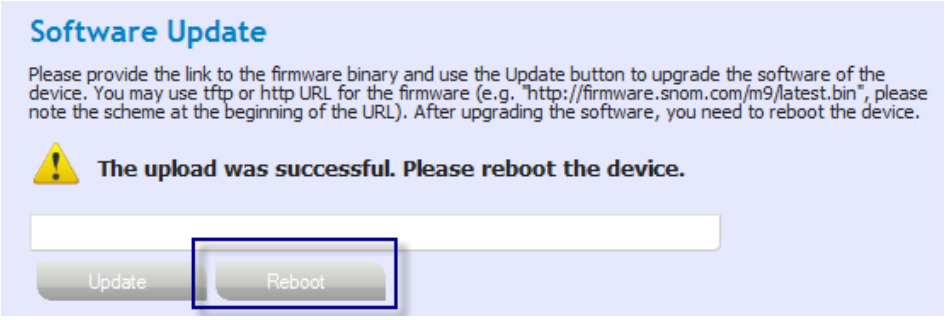


4. Log into the m9 web interface and click **Maintenance**, and paste the link as shown below:



5. Click **Update**.

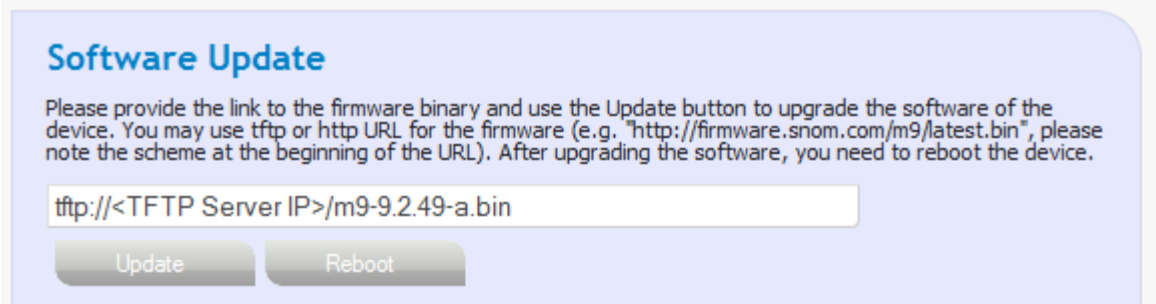
   The update status is indicated on the Web Interface



6. Click **Reboot**.

TFTP Firmware Update

1. Install a TFTP Server, e.g. Tftpd32, or check to see whether your IPBX has one built in.
2. Download the firmware from `wiki.snom.com`, as detailed on Page 80.
3. Put the firmware file into the `tftproot` directory of the TFTP Server.
4. Start the TFTP server on your PC.
5. Log into the m9 web interface and click **Maintenance** from the left navigation pane.
6. Enter the string shown below into the **Software Update** field, replacing `TFTP Server IP` with the IP address of your TFTP server.



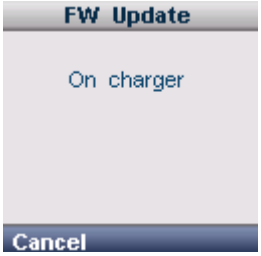
7. Click **Update**.

Handset Firmware Update

Over-the-Air Update

Over-the-air update refers to updating the handsets over the DECT (radio) interface. Each m9 firmware version includes a corresponding updated handset firmware version. After the base station has been upgraded to the new firmware, the handsets can be upgraded using this procedure.

1. From the handset, press the center navigation button, followed by ⚙ → **Handset** → **FW Update.**
2. The words “On charger” are displayed on the handset display.



3. Place Handset on charger.

   Upload progress is indicated on the handset display. The handset firmware update takes approximately 5 minutes.
4. For future firmware updates, select **Handset Reset** (⚙ → **Handset** → **Handset Reset**).

   Note: Up to four handsets can be updated in parallel.

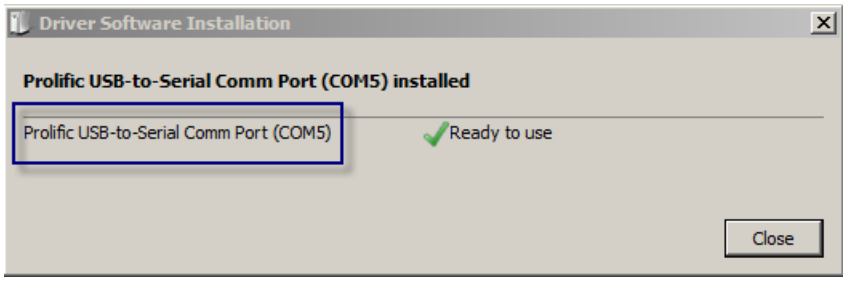
Firmware Update via USB Port

Handsets can also be upgraded via the USB port located underneath the battery cover. USB (Universal Serial Bus) is a standard cable connection interface on personal computers and consumer electronics. USB ports allow standalone electronic devices to be connected via cables to a computer (or to each other). USB can connect peripherals such as mice, keyboards, digital cameras, phones, printers, personal media players, flash drives, network adapters, and external hard drives.

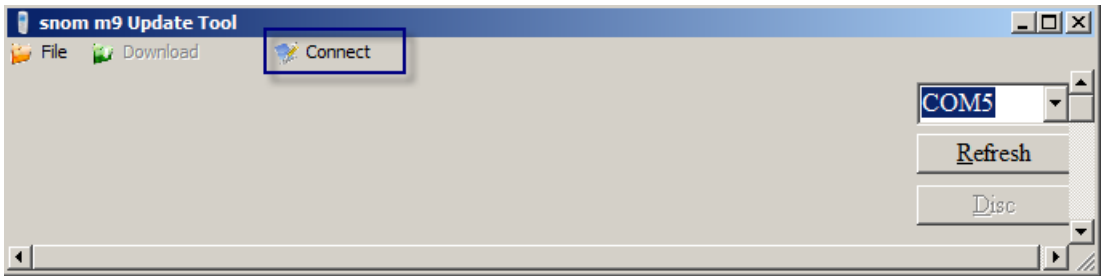
1. To locate the USB port on the handset, remove the battery cover.

2. Connect a USB cable to the PC, and plug the other end into the USB receptacle on the handset.

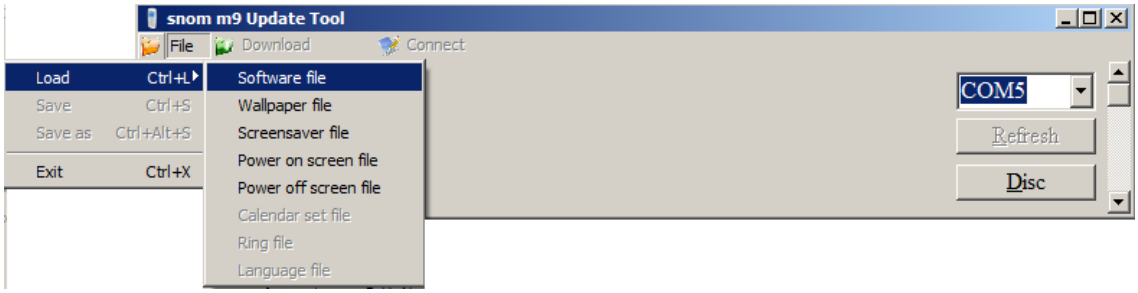
3. As Windows displays New Hardware Found, note the COM port assigned to the handset.



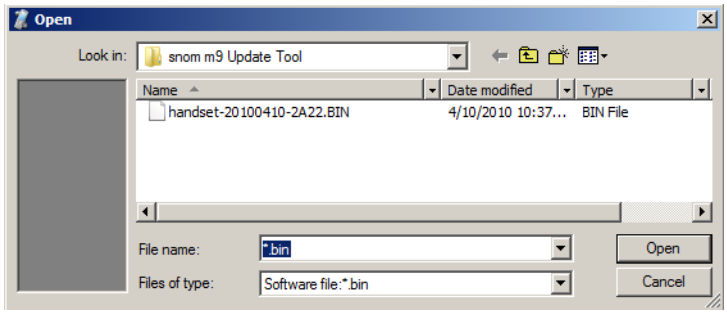
4. Before you can connect to the snom m9 handset, you need to download the snom m9 Update Tool. Download it at `http://provisioning.snom.com/m9/snomm9UpdateTool.zip` (available only in Windows).
5. Once downloaded, extract the ZIP file, then run the executable.
6. In the COM ports dropdown, select or enter the assigned COM port.



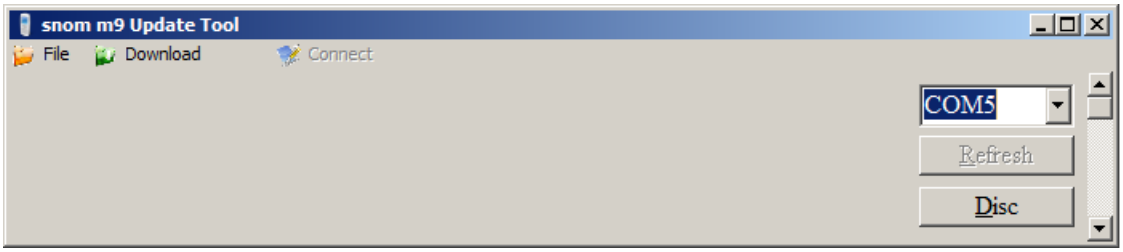
7. Click **Connect** at the top of the dialog box. If you entered the correct COM port, the **Connect** button will gray out.
8. Click **File** > **Load**, then select **Software file**.



9. From the file selection box, select the handset*.BIN file downloaded from the snom m9 web GUI.



10. Click **Open** to select the file.
11. To begin the firmware update, click **Download** at the top of the Update Tool screen.



12. The update status is displayed on the handset.

Auto Configuration and Firmware Update

To administer a large pool of snom m9 devices, the device provides the option to configure settings and upgrade device firmware with zero-touch interaction from the user. These mechanisms allow the administrator to manage and monitor all snom m9 devices in the network remotely.

The snom m9 Auto Provisioning feature allows multiple devices to be configured and upgraded automatically in parallel. Auto configuration is enabled by providing a settings server URL to the base station. This can be done manually or via DHCP. Three files are required when using Auto Configuration. The required syntax structure for each of the files is as follows:

Base file	000413231325.xml
Firmware file	firmware-000413231325.xml
Settings file	settings-000413231325.xml

An example of the base file (i.e., the provisioning URL) is shown below:

`http://server.example.com/m9/000413231325.xml`

The base file contains links to the `firmware` and `settings` files, as shown below:

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://10.10.10.89/settings.xml" />
  <file url="http://10.10.10.89/firmware.xml" />
</setting-files>
```

Root XML File

A base setting file may also be used with PHP to force devices to provide their MAC addresses. The server can then return the actual settings for each device based on its MAC address.

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>
    <base_pin perm="RW">1111</base_pin>
    <dhcp perm="RW">true</dhcp>
    <user_realname perm="RW" idx="1">100</user_realname>
    <user_expiry perm="RW" idx="1">180</user_expiry>
    <user_active perm="RW" idx="1">true</user_active>
    <user_host perm="RW" idx="1">ser.intern.snom.de</user_host>
    <user_outbound perm="RW" idx="1">sip:192.168.0.121</user_outbound>
    <user_ipui perm="RW" idx="1">005C30C840</user_ipui>
    <user_name perm="RW" idx="1">100</user_name>
    <telnet_enabled perm="RW">true</telnet_enabled>
  </phone-settings>
</settings>
```

Settings XML File

The firmware settings file links to the snom m9 base station firmware (the file pointed to in the link contains the base and handset firmware bundle).

```
<?xml version="1.0" encoding="utf-8" ?>
<firmware-settings>
  <firmware perm="">https://10.10.10.89/m9-9.2.45-a.bin</firmware>
</firmware-settings>
```

Firmware XML File

Address Book Provisioning with XML

Using XML files for the address book allows you to upload contacts into the snom m9 base station. Following is an example XML-based address book for the snom m9:

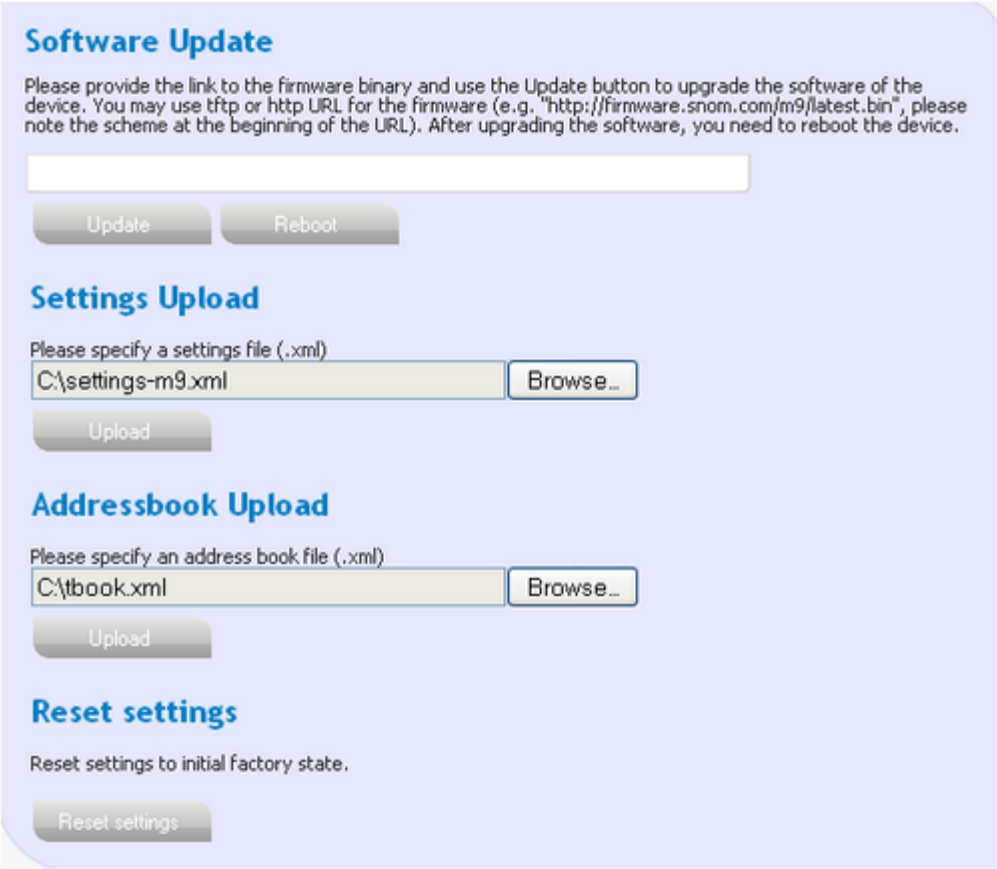
```
<?xml version="1.0" encoding="utf-8" ?>
<tbook e="2">
  <item context="line1" type="" fav="false" mod="true" index="0">
    <name>Kim Clyde</name>
    <number>96</number>
    <number_type>sip</number_type>
  </item>
  <item context="line1" type="" fav="false" mod="true" index="0">
    <name>Iris Flint</name>
    <number>961</number>
    <number_type>sip</number_type>
  </item>
  <item context="line1" type="" fav="false" mod="true" index="0">
    <name>Colin Kline</name>
    <number>962</number>
    <number_type>sip</number_type>
  </item>
  <item context="line2" type="" fav="false" mod="true" index="0">
    <name>Betty Graves</name>
    <number>963</number>
```

Each contact must be within its own `<item> </item>` begin and end tags and must include parameters such as `item context`, `type`, `name`, and `number`. These tags must be individually specified for all entries. There are no default values for tags that are left empty.

XML Tag	Description	Valid Values
`item context`	Indicates which outgoing line/identity/account will be used to call the contact.	`<line 1> ... <line 9>` `<global>`
`type`	Defines the type of contact.	`none`, `friends`, `colleagues`, `family`, `vip`, `deny`
`index`	Represents the contact's position within the list of entries. This value must be unique for each item.	Between 0 and 99 (maximum is 500 directory entried)
`name`	The contact's name.	Use alpha-numerical and/or special characters, like *, #, etc.
`number`	Phone number	All numbers (e.g., 9781234567)
`tbook complete`	Defines whether previous address book entries are deleted before new entries are loaded	`true`

Address book XML files can also be uploaded manually by clicking **Maintenance** from the left navigation panel.

If item context is set to `<global>`, the contact is added to all lines.



Dial Plans

A dial plan establishes the expected number and pattern of digits for a telephone number. This includes country codes, access codes, area codes, and all combinations of digits dialed.

On the snom m9, dial plans may provide the following functions:

- Automatic termination of emergency numbers at an emergency service provider
- Automatic recogition of number completion (e.g., ten-digit number in the U.S.)
- Automatic conversion of local numbers into global numbers (e.g., dialing 398330 in Berlin, Germany gets converted into +4930398330)
- Automatic appending of the local domain (e.g., dialing 398330 gets converted into `sip:398330@company.com;user=phone`)

Each identity on the snom m9 can be configured to include these dial patterns.

Configuration

Dial plan entries consist of three parts (pattern, result, and flags), each of which may be separated by any character. Typically, the characters "!" or "|" are used as field separators.

- **Pattern:** The pattern field is used to interpret digit sequences that will be used to decide on routing. In most cases, simplified expressions consisting of literals, prefixes, and fixed patterns will suffice.
  - Literals: If you want to match a specific number, just enter the exact number (e.g., `911`). The literal will be the first match in the expression.
  - Prefixes: Prefixes allow you to route numbers that begin with identical prefixes through the same trunk. For example, by specifying the common prefix `9011` in the pattern field, all international numbers will be routed through the same trunk. To indicate that a prefix is being using, an asterisk must be entered after the prefix (e.g., `9011*`).
  - Fixed patterns: If you use an `x` in a pattern, the system will treat it as a wildcard for 0-9. For example, `978xxxxxxx` will route all calls beginning with the area code 978 through the same trunk.
- **Replacement**: The replacement string is used to convert digit sequences into a dial string for outbound calling. It is used in the `To` header as well as in the Request-URI. Replacement strings are found in the second part of the dial plan entry and are marked by a leading \

Replacement	Definition
`d`	The d replacement inserts the name of the registrar. *Example*: `!*!sip:\1@\d!` This replacement string inserts the domain name behind the @ symbol.q

	Numbers are back references to match-groups of the regEx part according to RFC2915. *Example*: `!(.+)!sip:\1!` inserts a `sip:` before the string (which is the first match).

- **Flags**: Flags set additional processing attributes. The following flags are available:

Flag	Definition
`d`	Indicates that the number is complete and can be dialed. *Example*: `|([0-9]{5})|sip:\1@test.com|d` means that a number with five digits will be dialed automatically.
`i`	Indicates that the comparisons should be done case-insensitive.

Dail Plan Examples

Table 1 Examples of Dial Plans

Goal	Pattern and Result
To make the phone dial a number when the pound (#) key is pressed.	`!([^#]+)#!sip:\1@\d!d` The dial plan entry will look for a pattern ending in a pound (#) symbol and will use this as the user name in a SIP URI (not including the # symbol).
To match an international number	Put the `011` pattern at the front of the pattern: `|^011([0-9]*)$|sip:+\1@\d;phone=yes|`

To add area codes	*Example 1*: If the phone number has digits between 3 and 6, then use an area code:
	
	`|^([0-9]{3,4})$|sip:030\1@\d””|^([0-9]{5,6})$|sip:030\1@\d`
	
	Example 2: Use an area code all the time:
	
	`|^([0-9])$|sip:030\1@\d`

To call a complete URI	This is a little bit more difficult because of the number of allowed characters in the user name. The following characters can be a base for such a dial plan entry: `|^([a-zA-Z0-9&=+\$,;?\-_.!~*'()%]+@.+)|sip:\1|`

Goal	Pattern and Result

To use leading zeros	If a number starts with 9 and has at least 8 further digits, then use a leading zero.
	`|^9([0-9]{8})$|sip:09\1@\d`
	If a number has 2 digits, don't use a leading zero. When more than 2 digits, use the leading zero:
	`|^([0-9]{3,})$|sip:0\1@\d`

To separate star (*) codes from standard numbers	Sometimes a dial plan is needed to add a leading 0 to an outgoing number not starting with 0 (e.g., 3039833104) so that it will be dialed as 03039833104, but you want to make sure that if the number were 03039833104, that it's not converted to 003039833104. When this is the case, you could use the following string for this purpose:
	`|^([1-9]{2})([0-9]{6,})$|sip:0\1\2@\d`
	But if a star code is followed by a destination, e.g., *7939833452, it is not desired to convert it to 07939833452 because the PBX is expected to get the whole string and use it accordingly. Hence, we can concatenate a plan to the one above to make provision for such exceptions:
	`|^\*([0-9]*)$\|sip:*\1@\d""\|^([1-9]{2})([0-9]{6,})$|sip:0\1\2@\d`
	Separated by the exclamation mark, it contains the pattern for the 911 and the resulting SIP URI.

To concatenate dial plans	To concatenate dial plans, just write them one after another including "" quotes. You will get the following after concatenating the above two dial plans: `|^9([0-9]{8})$\|sip:09\1@\d" "\|^([0-9]{3,})$|sip:0\1@\d`
To dial a certain number with another outgoing identity	`|^911|^112|sip:emergency@provider.de|d`

Emergency Calling

Dial plans can also be particularly useful for providing emergency calling services (e.g., 911, 112, 999) in VoIP networks. The following examples indicate how dial plans may be used on the snom m9 to provide emergency calling services.

Table 2 Examples of Dial Plans for Emergency Dialing

Goal	Pattern and Result
Convert an emergency number into a SIP URL	This pattern could look like this: `!^911$!sip:emergency@local!d` Separated by the exclamation mark, it contains the pattern for the 911 and the resulting SIP URI.
Dial a certain number with another outgoing identity	`^911|sip:emergency@provider.de|d`

LDAP

LDAP, or Lightweight Directory Access Protocol, is an Internet protocol that clients can use to look up information from a server. The snom m9 base station supports LDAP server configuration for each SIP identity (shown below). This enables the base station to perform LDAP look-ups for incoming calls. Configuration details are outlined in Table 3.

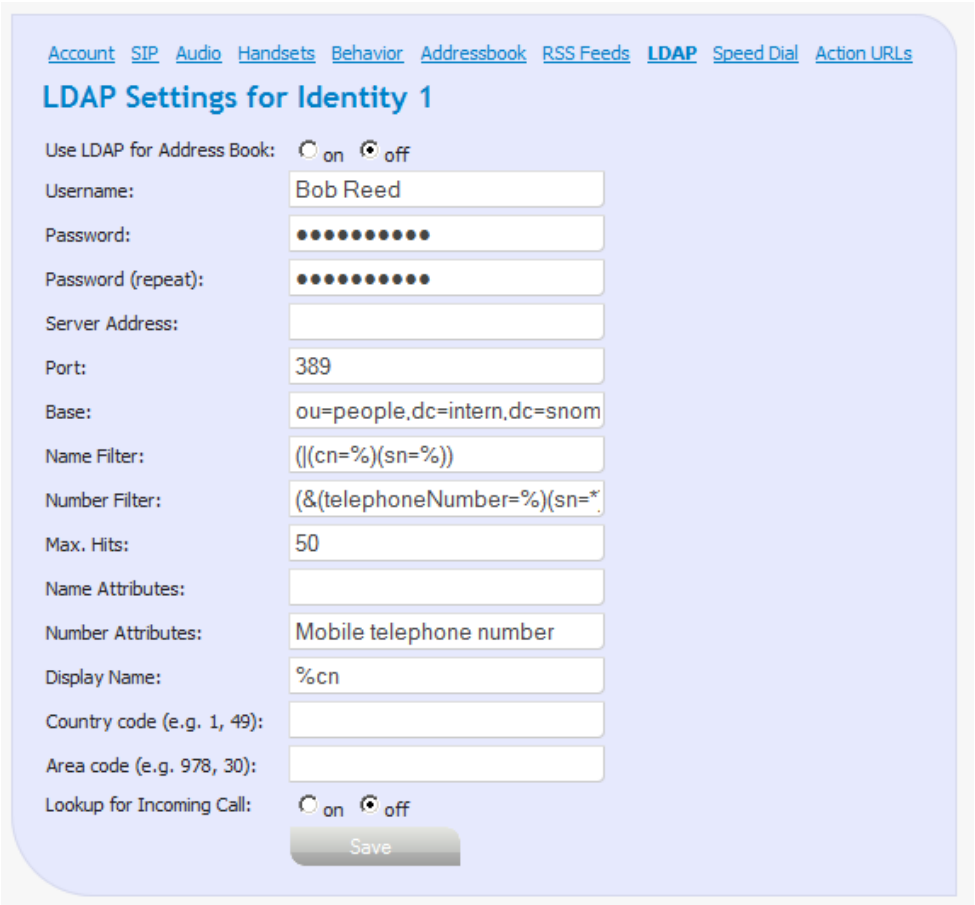


Table 3 LDAP Parameters and Values

Parameter	Function/Description	Valid Value	Default
<user_ldap_ outgoing_ phonebook>	Enable LDAP—If enabled, LDAP will be used; otherwise, the normal vCard phone book will be used.	<on>, <off>	<off>
<user_ldap_ username>	Username—Here you can set a user name to know what LDAP contacts are related to this user.	String to be used	Blank
<user_ldap_ password>	Password—Here you can set a user password.	Password string	Blank
<user_ldap_ password>	Password repeat—Here you can set a user password.	Password string	Blank
<user_ldap_ server_name>	Server address—This setting refers to the DNS name or IP address of the LDAP server.	IP address or domain	Blank
<user_ldap_ port>	Port—This setting specifies the LDAP server port. In case the setting is not configured, the default LDAP port (389) is taken.	0-65535	Blank
<user_ldap_ base>	Base—This setting specifies the LDAP search base (the distinguished name of the search base object) which corresponds to the location in the directory from which the LDAP search is requested to begin. The search base narrows the search scope and decreases directory lookup time. If you have multiple organizational units in your directory (for example, OU=Sales in O=COMPANY and OU=Development in O=COMPANY), but the "OU=Sales" organization never uses AOL AIM, you can restrict the lookup to only the OU=Development subtree by providing the following search base: OU=Development, O=COMPANY.	String such as the following: `o=UNIVERSITY OF NEW ORLEANS,c=US`	Blank
<user_ldap_ name_filter>	Name filter—The LDAP name filter is the search criteria for name look-ups. The format of the search filter is compliant to the standard string representations of LDAP search filters (RFC 2254). The name prefix for search entered by the user is represented by the "%" symbol in the filter.	Standard LDAP filters, e.g., `(&(sn=%)(telephoneNumber=*))`	Blank

Parameter	Function/Description	Valid Value	Default
<user_ldap_number_filter>	Number filter—The LDAP number filter is the search criteria for number look-ups. The format of the search filter is compliant to the standard string representations of LDAP search filters (RFC 2254). The number prefix for search entered by the user is represented by the "%" symbol in the filter.	Standard LDAP filters, e.g., `(|(telephoneNumber=%)(Mobile=%)(ipPhone=%))`	`Blank`
<user_ldap_max_hits>	Maximum hits—This setting specifies the maximum number of search results to be returned by the LDAP server. Note that a very large value of the "Max. Hits" will slow down the LDAP lookup, so the setting should be configured according to the available bandwidth.	Numbers	50
<user_ldap_name_attributes>	Name attributes—This setting can be used to specify the "name" attributes of each record that is to be returned in the LDAP search results. This setting compresses the search results, as the server returns only the attributes which are requested by the snom phone. The setting allows the user to configure multiple space-separated name attributes. Please consult your system administrator regarding the name attributes that are to be configured.	Space-separated name attributes	Blank
<user_ldap_number_attributes>	Number attribute—This setting can be used to specify the "number" attributes of each record that is to be returned in the LDAP search results by the LDAP server. This setting compresses the search results, as the server returns only the attributes that are requested. The user can configure multiple space-separated number attributes by using this setting. Please consult you system administrator regarding the number of attributes that are to be configured.	Space separated number attributes, e.g., `telephoneNumber Mobile ipPhone Home`	Blank
<user_ldap_display_name>	Display name—This setting specifies the format in which the "name" of each returned search result is to be displayed on the snom phone. The setting allows combinations of various "name attributes" along with special characters.	Any combination of LDAP name attributes with special characters.	Blank

Parameter	Function/Description	Valid Value	Default
<user_ldap_country_code>	Country code—This setting is used for specifying standard country codes that are to be substituted in LDAP search requests.	Standard country codes	Blank
<user_ldap_area_code>	Area code—This setting is used for specifying standard country codes that are to be substituted in LDAP search requests.	Standard country codes	Blank
<user_ldap_lookup_incoming>	Lookup for incoming call—This setting can be used to enable calling line identification using LDAP. When this setting is turned on, the phone performs an LDAP number search for the incoming number and displays the name of the calling party accordingly.	<on>, <off>	Blank

Table 4 Sample LDAP XML Configuration

<user_ldap_outgoing_phonebook idx="INDEX" perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_outgoing_phonebook>
<user_ldap_username perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_username>
<user_ldap_password perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_password>
<user_ldap_password perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_password>
<user_ldap_server_name perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_server_name>
<user_ldap_port perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_port>
<user_ldap_base perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_base>
<user_ldap_name_filter perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_name_filter>
<user_ldap_number_filter perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_number_filter>
<user_ldap_max_hits perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_max_hits>
<user_ldap_name_attributes perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_name_attributes>
<user_ldap_number_attributes perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_number_attributes>
<user_ldap_display_name perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_display_name>
<user_ldap_country_code perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_country_code>
<user_ldap_area_code perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_area_code>
<user_ldap_lookup_incoming perm="PERMISSIONFLAG">VALIDVALUE</user_ldap_lookup_incoming>

IPv6 and m9 DECT

IPv6 was developed by the Internet Engineering Task Force (IETF) during 1991–1997 to deal with the long-anticipated IPv4 address exhaustion; however, the advantages of IPv6 exceed the increased address space (from 32-bit to 128-bit). The primary advantages are detailed below:

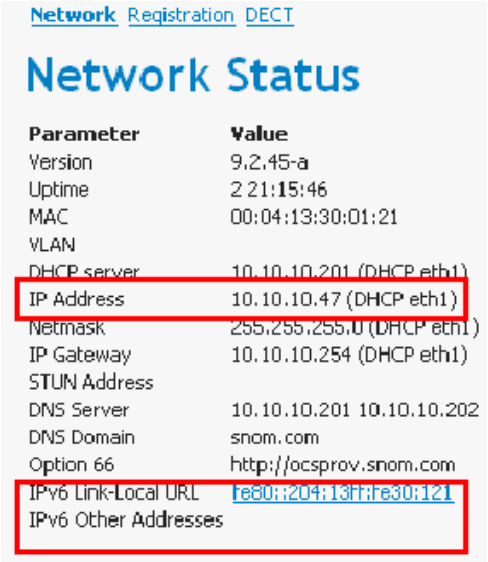
Goal	Pattern and Result
Larger address space	128-bit addresses instead of the 32-bit addresses of IPv4
Multicast	Transmission of a packet to multiple destinations as part of the base specification
Auto-configuration	Neighbor Discovery and address auto configuration allow hosts to operate in any location without any special support (PnP)
Network security	Security features are mandated in IPv6 (IPSEC)
IPv6 mobility	No triangle routing—IP mobility is native to IPv6
Extensibility options	Efficient and extensible IP datagram

Address Assignment and Auto Configuration

The snom m9 is IPv6-ready so it can automatically assign an IPv6 address to the device over DHCPv6, and when connected to an IPv6 network, it can configure itself automatically using Internet Control Message Protocol version 6 (ICMPv6) router discovery messages. The Dual IP Stack allows the snom m9 to maintain IPv4 and IPv6 interfaces in parallel.

Dual IP Stack

The ability to perform DHCPv6/ICMPv6 queries simultaneously with the IPv4 DHCP queries allows the snom m9 to maintain multiple IPv4 and IPv6 interfaces in parallel.



DNS

Support for IPv6 naturally allows the snom m9 to perform AAAA queries for IPv6 address lookups. For routing packets to IPv6 destinations, snom m9 uses its local IPv6 interface, if available.

SIP

Depending on the type of address returned (IPv4 or IPv6) for a SIP server, the snom m9 automatically selects the corresponding IP interface for registration. SIP packet addresses and headers are also automatically substituted with the appropriate IP interface. Following is a REGISTER sample:

```
REGISTER sip:cs410.snom.com SIP/2.0
Via: SIP/2.0/TLS fe80::6dff:f2df:d3bf:1e2 :2077;branch=z9hG4bK-rib4emgq;rport
From: "Hanna Flanders" <sip:520@cs410.snom.com>;tag=fwxg2s0u4i
To: "Hanna Flanders" <sip:520@cs410.snom.com>
Call-ID: 3c267028e8ad-q7dwiql86rvc
CSeq: 6134 REGISTER
Max-Forwards: 70
Contact: <sip:520@fe80::6dff:f2df:d3bf:1e2 :2077;transport=tls;line=ibeyjpgk>;
reg-id=1;q=1.0;+sip.instance="<urn:uuid:0fe6493a-4223-49f7-9aa6-4fb5e5198e0f>"
[7] 2010/04/14 16:05:16:      SIP Tx tls:fe80::6dff:f2df:d3bf:1e2 :2077:
SIP/2.0 200 Ok
```

SECTION II: The m9 in Action

Handset Overview

Navigation key: In idle mode, press the center navigation key to get to the main menu. In other contexts, press this key to navigate the menus and lists.

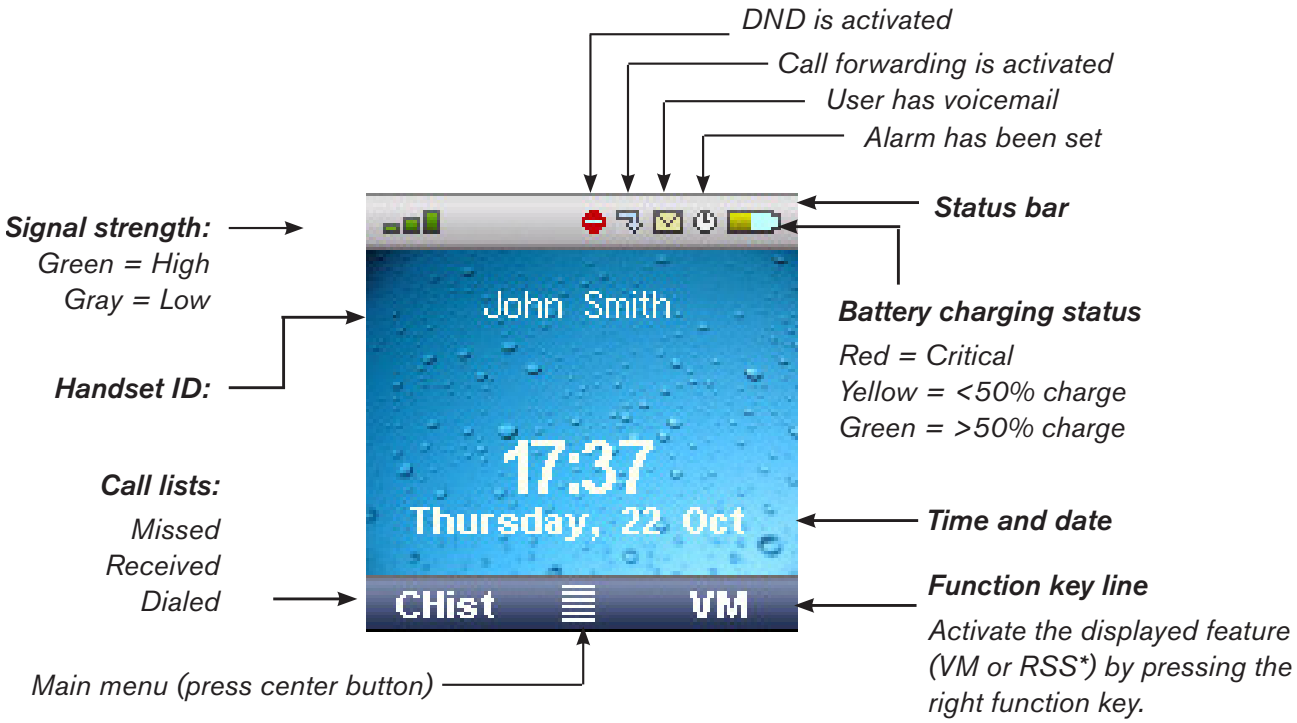
Navigation wheel: In idle mode, press the top/bottom/right/left edge of the navigation wheel (depicted in this guide by ↑↓→←, respectively) to open the following menus or functions:

↓	Directory
←	Intercom
→	Settings menu
↑	Preferences menu

In other contexts, press ↑ or ↓ to navigate in menus and lists.

Idle Screen Display Symbols

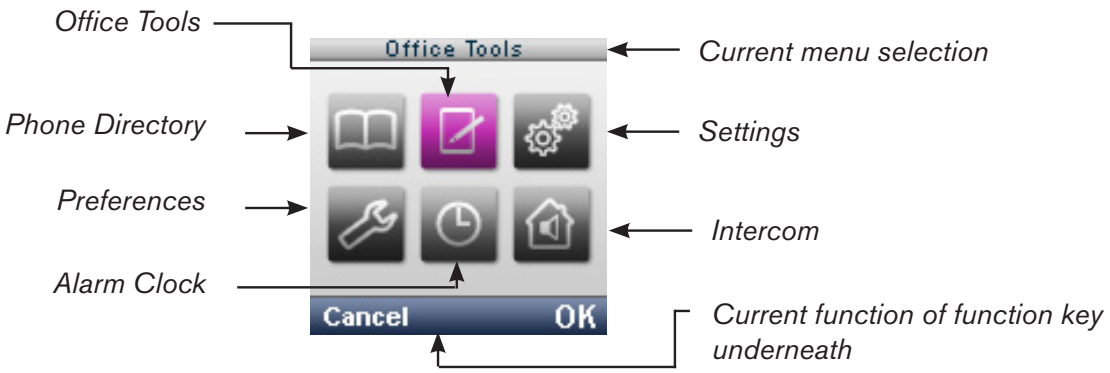
Symbols on the phone display when the phone is in idle mode are considered idle screen display symbols. These symbols indicate the status of DND and call forwarding. They also indicate whether a user has voice-mail, the battery needs to be recharged, or an alarm has been set. These and other symbols are outlined below:



*RSS (Really Simple Syndication) feeds are used to stream data to the phone. Example are displayed on Page 72.

Navigating the Phone Menus

With the phone in idle status, press the center navigation key. Six different menu options are displayed:



Navigating the Phone

To navigate to a menu option:

1. Press the center navigation key on the phone.
2. To select a menu option, press the top/bottom/right/left edge of the navigation wheel (indicated in this guide by ↑↓→←).
3. Press the center navigation key again to open the submenu functions.
4. Navigate by using ↑↓→←.
5. Make your selection by pressing the center navigation key.
6. To cancel or to return to the idle screen, press the red phone button or press Cancel.

Phone Tree

Icon	Main Menu	Sub-Menus	Page Reference
	Phone Directory	None	Page 63
	Office Tools	Stopwatch	Page 69
		Calculator	Page 69
		Notepad	Page 70
		Calendar	Page 70
		RSS Reader	Page 72
		Voicemail	Page 52

	Settings	Date/Time	Page 49
		VoIP	
		Display Name	
		Account	
		Password	
		Registrar	
		Outbound Proxy	
		Mailbox	
		Network	
		VLAN	
		DHCP	
		Handset	
		Register handset	
		Select base	
		Deregister handset	
		Reset handset	
		Reset base	
		FW update	
		Version	
		Change PIN	
		System Info	Page 24
		MAC address	
		IP address	
	Preferences	Language	Page 73
		Display	
		Screen Saver	Page 74
		Wallpaper	Page 74
		Contrast	Page 74
		Backlight	Page 74
		Audio Settings	
		Ringer Settings	Page 75
		Advisory Tones	Page 76
		Auto Answer	Page 76
		Call Forwarding	Page 76
	Alarm Clock		Page 58
	Intercom		Page 59

Setting the Date and Time

It's critical that the handset shows the correct time so that incoming calls will show this and so that the alarm clock can be used. While the system should automatically get its time from a time server, the time can also be changed manually from the handset.

1. Press the center navigation button, followed by ⚙ → **Date/Time.**
2. Make the appropriate changes:

   Time Server: If you have a local time server in your network or if you want to use some other public time server, you can change the time server here. The default time server is `pool.ntp.org`. Your SIP server may also act as a time server.

   Timezone: To get the GMT offset for your region, open your computer's control panel and click Date and Time (or go to dateandtime.com).

   Format:

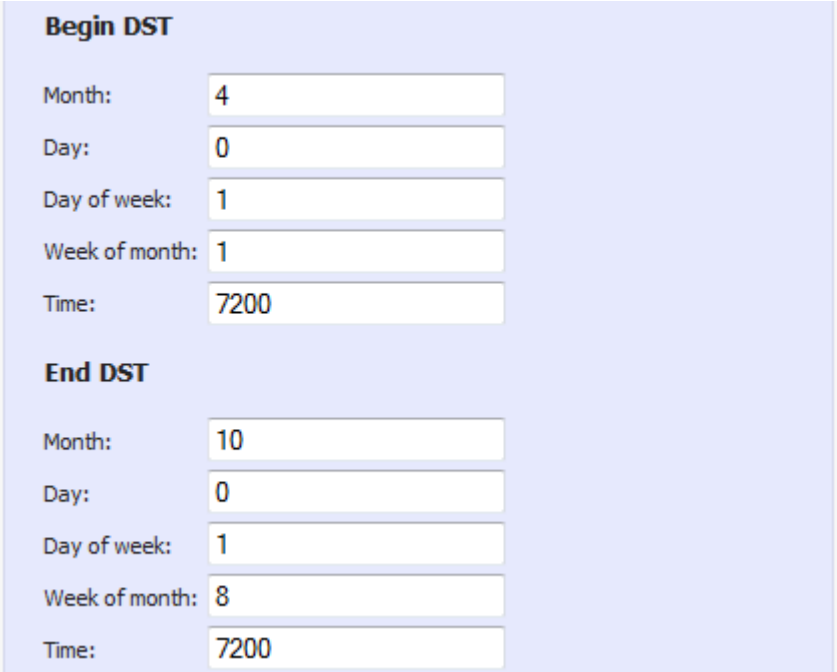
   - **Date Format:** Choose between two formats: `Day, MM DD` (Monday, Feb. 02) or `DD/MM/YYYY` (02/02/2011).
   - **Time Format:** Choose between the 12-hour format (06:00 P.M.) and the 24-hour format (18:00).

Daylight Saving Time (DST)

Daylight Saving Time or DST is the practice of temporarily advancing clocks during summertime so that afternoons have more daylight and mornings have less. The snom m9 also allows users to set up DST according to their time zone and adjust DST shifts as needed. To set up DST:

1. Select **Time/Language** from the left navigation panel.
2. From the **Time Zone** dropdown, select **Specify Details**.

The page is expanded:



3. Use the following table to familiarize yourself with the configurable parameters for DST:

```
gmt_offset: Standard GMT Offset for the phone's time zone
dst_offset: DST Offset from phone's time when DST is in effect
dst_start_month: Month in which DST starts (1-12)
dst_start_day: 1-31, 0 = inactive (use dst_start_day_of_week and dst_start_week_of_month instead)
dst_start_day_of_week: Day of week when DST comes into effect (1 = Sun, 7 = Sat)
dst_start_week_of_month: Week of month in which DST starts (8=last week of month)
dst_start_time: Time of day in which DST starts (in seconds)
dst_stop_month: Month in which DST stops (1-12)
dst_stop_day: 1-31, 0 = inactive (use dst_start_day_of_week and dst_start_week_of_month instead)
dst_stop_day_of_week: Day of week when DST is no longer applicable (1 = Sun, 7 = Sat)
dst_stop_week_of_month: Week of month in which DST stops (8=last week of month)
dst_stop_time: Time of day in which DST stops (in seconds)
```

Basic Calling

Making Calls

1. Enter the extension or number followed by (the green key).

Ending a Call

Press (the red key).

Accepting a Call

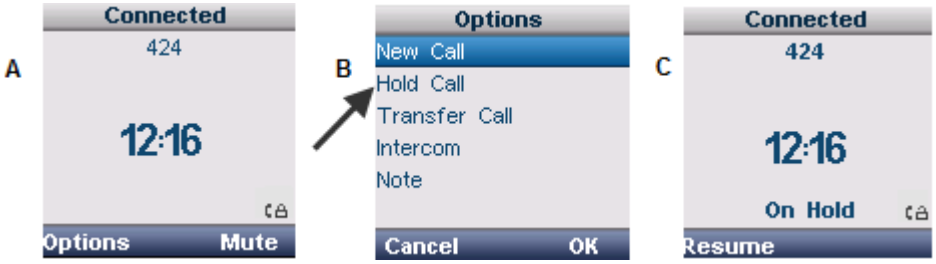
Incoming calls are identified in two ways: through the ringing of the phone and via the handset display. To accept the call, press .

Note: If Auto Answer (Page 59) has been activated, the handset will automatically take the call once it has been lifted out of the cradle. If the handset is not in the cradle, the call will be connected immediately.

Call Hold

1. While connected to a call, press **Options** to bring up Options menu (image A).
2. Select **Hold Call** (image B).

   The call will be placed on hold (image C):



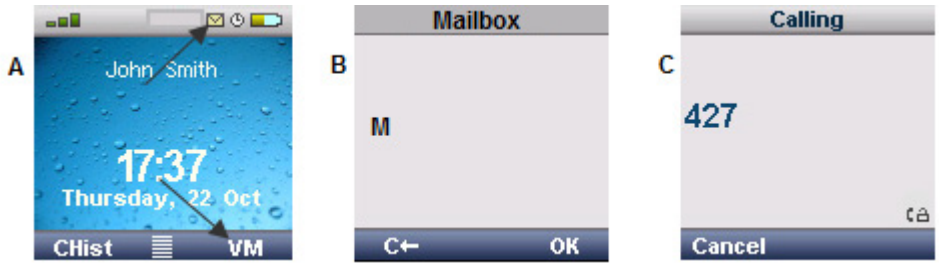
3. Press Resume to re-connect the held call.

Using Voicemail

Voicemail is indicated in two ways: (1) by an envelop icon at the top of the display and (2) a VM in the lower right-hand corner (see image A).

To listen to the voicemail:

1. Press the VM softkey (image B).
2. At the Mailbox screen, press OK (image B). Your messages are read out during the Calling screen (image C).



Note: If you are using a voicemail system (such as Microsoft Exchange Server) that does not notify the voicemail status, you can access your mailbox using Office Tools:

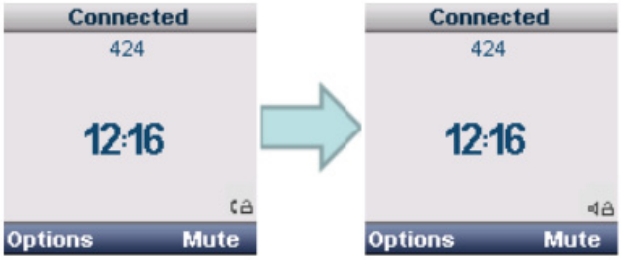
1. Press the center navigation button, followed by → **Voicemail**.
2. Press the VM softkey.

Hands-Free Speaker Mode

To switch the handset to speaker mode for hands-free usage, simply press the speaker key on the side of the handset to enable speaker mode.

Note: The handset can be switched back to normal mode by pressing the green “call” button.

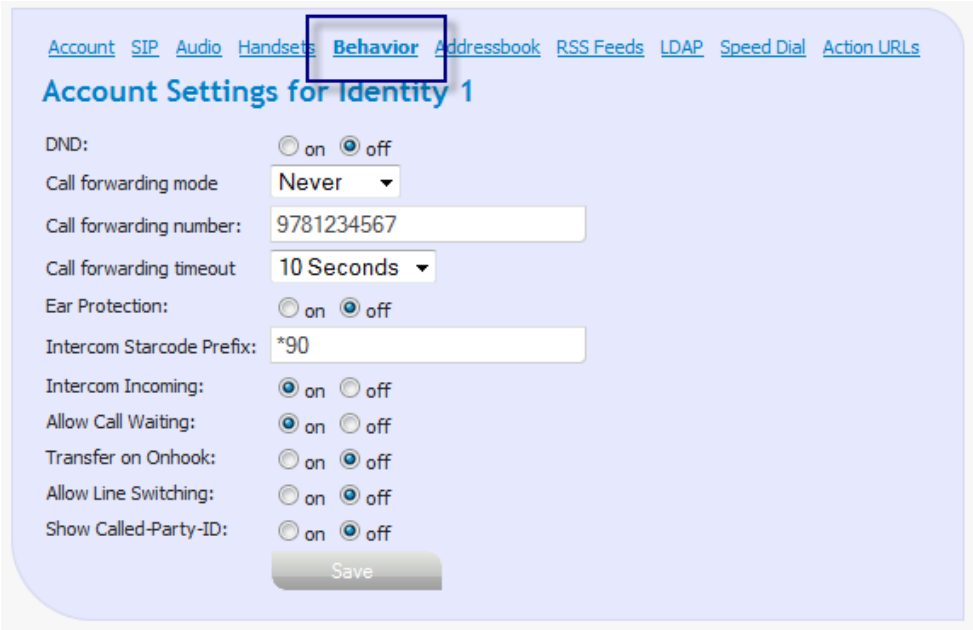
Note: To place a call in hands free mode, enter the desired number, press the OK key to dial, and then press the speaker key (Page 4) to enable hands-free mode.



Changing the Volume in Speaker Mode

The Ear Protection setting activates lower speaker volumes on connected snom m9 handsets. By default this setting is turned off. To re-enable the normal speaker levels on the connected handsets:

1. Log in to the m9 web interface.
2. Click the identity that belongs to the handset.
3. Click **Behavior**, then set Ear Protection to off.



Switch to Mute

To mute an ongoing call, press the Mute softkey on the handset. To unmute the call, press **Resume**.

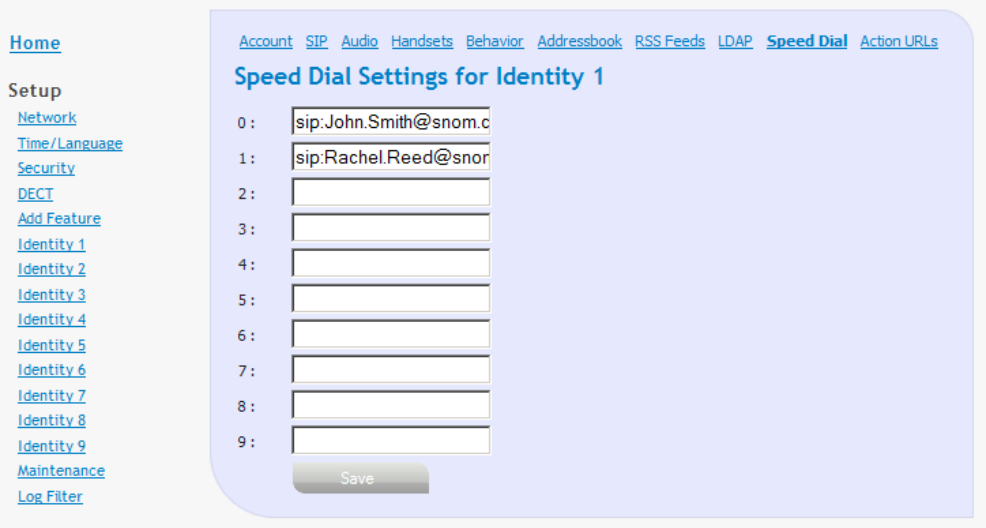
Speed Dialing

This feature allows the m9 handset to perform single-digit dialing to SIP URIs or E164 numbers. This function is particularly useful for phone users who dial certain numbers on a regular basis. Every SIP Identity provides up to 10 speed dials for the handset.

To use the speed dialing feature of the snom m9, simply configure a number or SIP URI in one of the speed dial entries. To place a call to the speed dial destination, simply dial the corresponding digit on the handset. E.g., in the example shown below, the user would dial "1" on the handset to call sip:Rachel.Reed@snom.com

Note: SIP URIs used as speed dial destinations must be configured with a "sip:" prefix.

Note: Speed dials can be set up only through the web portal, so often the administrator is the one who sets them up.



Transferring Calls

Call Transfer (Blind)

1. While connected, press Options to bring up the Options menu.
2. Select Transfer Call.

3. Enter transfer destination number, and press OK.

   The handset performs the transfer and returns to idle mode.

   Note: The function uses SIP REFER for Call Transfer.

Call Bridging (Attended Transfer)

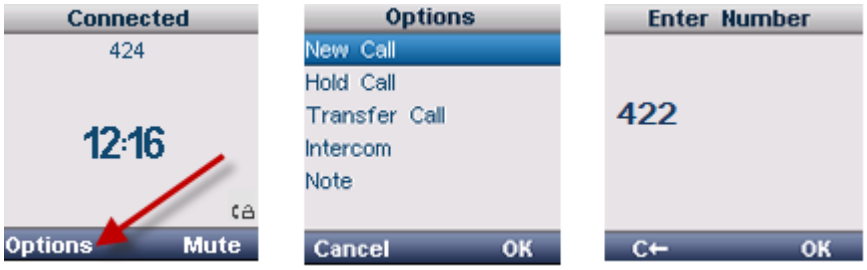
1. While connected, press Options to bring up Options menu.
2. Select New Call.
3. Enter number and press OK.
4. When “Connected, press Options to bring up Options menu.
5. Select Bridge Calls.

   The handset performs transfer and returns to idle mode. (The function uses SIP REFER for Attended Transfer. Make sure your IPBX supports this.)

   Note: Call Bridging can also be performed with the Hangup key by enabling the setting **Identity** > **Behavior** > **Transfer on Onhook**.

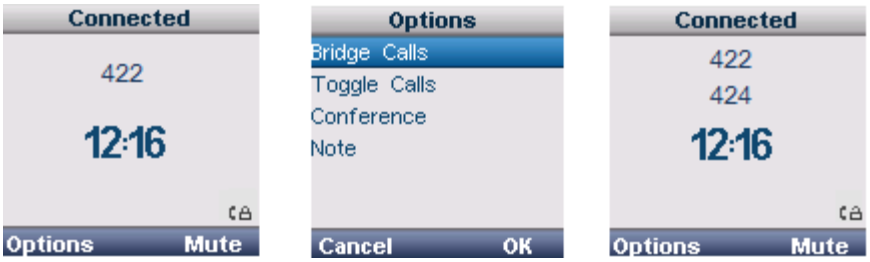
Conferencing

1. While connected, press Options to bring up the Options menu.
2. Select New Call.
3. Enter number and press OK.



4. When connected, press Options to bring up Options menu.
5. Select Conference.

   All three parties are now connected and can send and receive audio to one another.

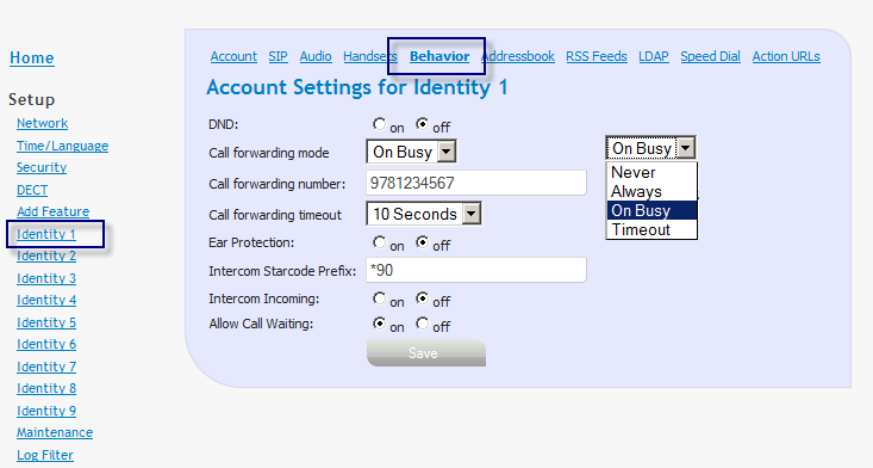


Forwarding Calls/Redirection

Call Forward

You can forward your calls to another number. As shown in the following image, the settings that can be used for forwarding calls are Never, Always, On Busy, and Timeout.

1. Click **Identity** from the left panel.
2. Click **Behavior** as shown below.
3. Choose a call forwarding mode from the **Call forwarding mode** dropdown.
4. Enter a forwarding destination into the **Call forwarding number** dropdown.
5. From the **Call forwarding timeout** dropdown, select a timeout.

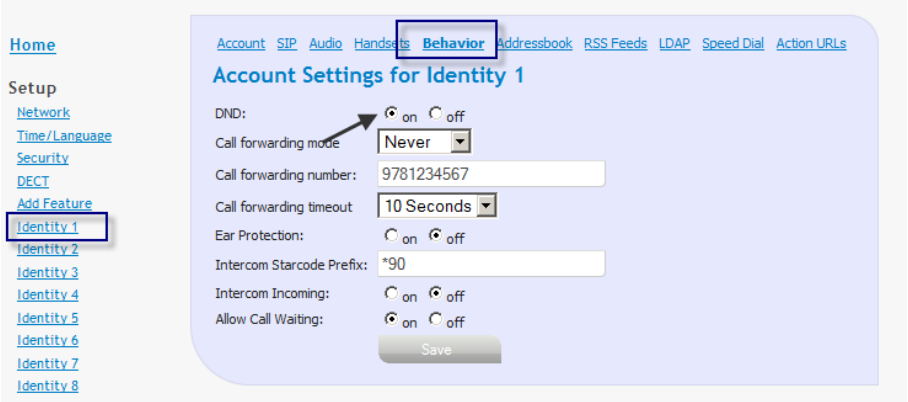


The forwarding status is indicated on the handset:

Do Not Disturb

Activating DND will reject all incoming calls for the SIP Identity and its associated handset will not be alerted.

1. Click **Identity** from the left panel.
2. Click **Behavior** as shown below.
3. Set DND to **on**.



DND status is indicated on the handset.

Setting the Alarm Clock

Setting the Wakeup Time

Important: The date and time must already be set (see Page 49).

1. Press the center navigation button, followed by .
2. To set the time, select **Time** and press **OK**.
3. Enter the wakeup time.
   - 12-hour format: If you are using the 12-hour format, enter the wakeup time in 12-hour format (e.g., 05:00 PM for 5 p.m.). To switch between A.M. and P.M., use the top/bottom edges (↑↓) of the navigation wheel before pressing OK.
   - If you are using the 24-hour format, enter the wakeup time in 24-hour format (e.g., 15:00 for 3:00 p.m.).
4. Press OK.
5. If you want to select a new volume or ring melody, select **Alarm Ringer**.
   - **Volume**: Set the volume (1–6).
   - **Ringtone**: Ten different ringtones are available.
6. Press OK to save the settings.
7. To activate the alarm, check the **Activate** box.

   The is displayed in idle status:

Deactivating the Wakeup Call

To deactivate a wakeup call that has already been set:

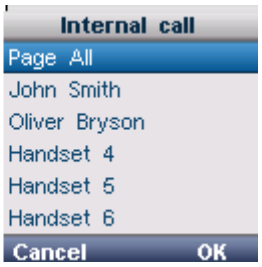
1. Press the center navigation button, followed by .
2. Click OK to deactivate the wakeup call, and press **OK**.
3. Press .

The same steps can be used to activate a wakeup call.

Intercom

Intercom is used to talk to other handsets on the same base station, just by dialing the extension (e.g., 40). However, the handsets *cannot* be registered to the same extension. Each handset must have its own extension if you want to intercom between the handsets.

1. Press left cursor on phone, or press the center navigation button, followed by .
2. Select handset to call or press OK.

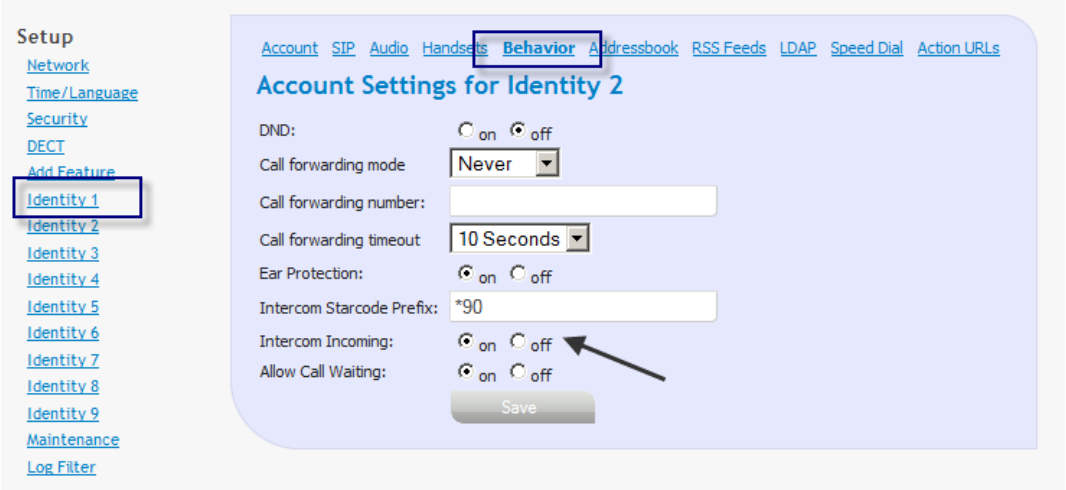


Intercom/Auto Answer (SIP)

Activating “Intercom Incoming” for a SIP Identity enables the associated snom m9 Handset to automatically accept incoming calls. The Intercom feature requires SIP Alert-Info functionality from the calling party.

1. Enter a star code prefix into the Intercom Starcode Prefix field.

   Parties called with this prefix will receive intercom calls.



Call Waiting Indication

When a new call rings your extension while you are on a current call, the phone display will reflect a Call waiting indication ("CWI") toward the bottom of the phone display (see second image):

To accept the waiting call:

1. Click the **Options** menu.
2. Click **Accept** to accept the call. (This places the current call on hold and accepts the waiting call.)

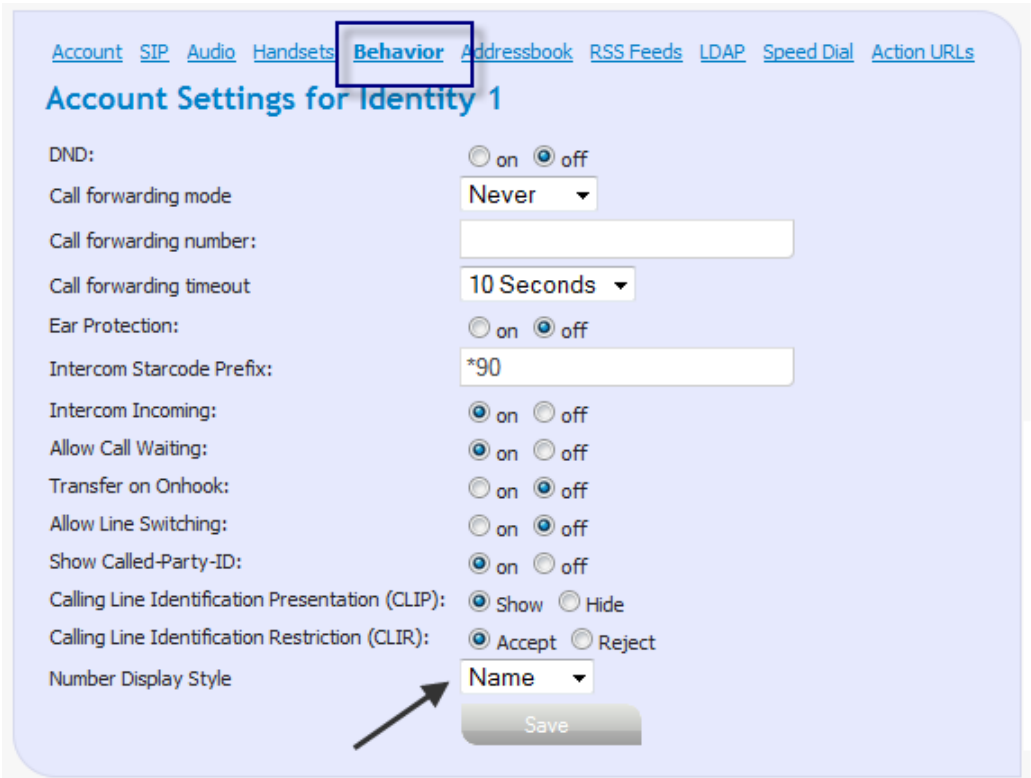
To reject the waiting call:

1. Click the **Options** menu.
2. Click **Reject** to deny the call. (This rejects the waiting call and continues with the active call.)

Calling and Called Party ID

By default, the snom m9 handset displays only the Calling Party ID (CLIP). This behavior can be altered through the **Called-Party-ID** setting (Identity > Behavior > Show), as shown below. When this setting is switched on, the handset displays both the Calling and Called Party number or name.

The **Number Display Style** setting allows users to display the name or number of the calling party as desired.

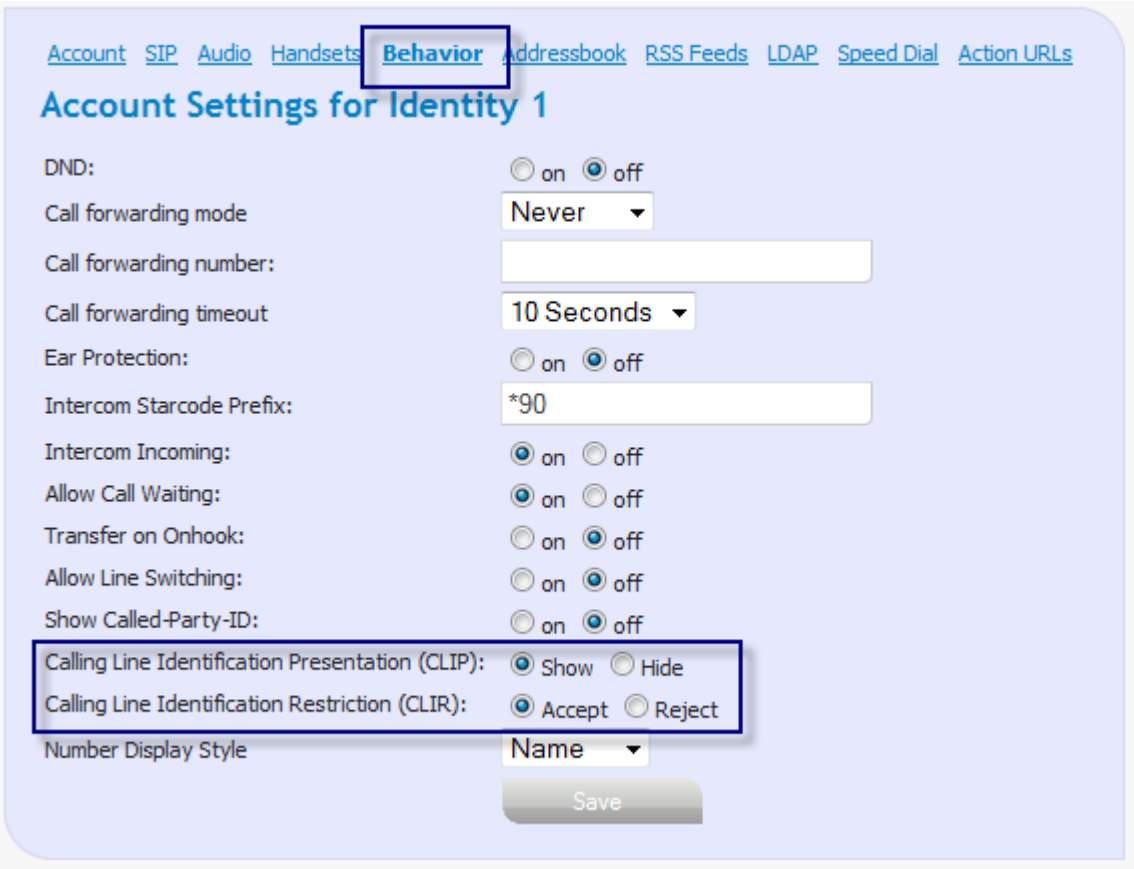


F = From (Calling Party)
T = To (Called Party)

CLIP/CLIR

The CLIP property sets the state of the calling line identification presentation service on the m9. If set to **Show**, the m9 presents its number to the called party. If set to **Hide**, the m9 places the call from an anonymous account.

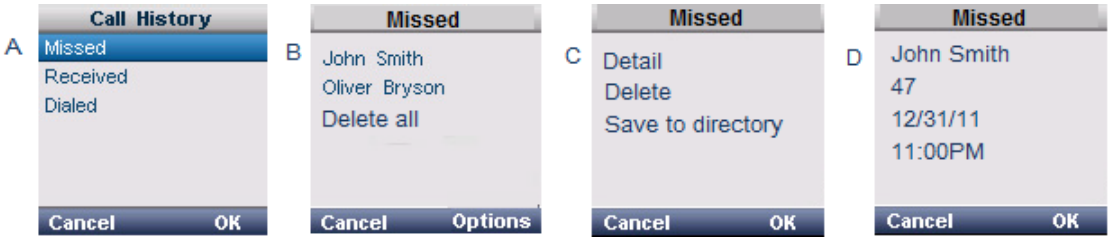
The CLIR property sets the state of the calling line identification restriction service on the m9. If set to **Accept**, the m9 accepts calls from anonymous users who do not present the calling-party number. If set to **Reject**, calls received from anonymous users are rejected.



Call History

Calls lists can be accessed by pressing the CHist soft button as shown below:

The CHist button offers three options: Missed, Received, and Dialed calls (image A). Each option will present a list of contacts (image B). Once a contact has been selected, more options are presented: Detail, Delete, and Save to directory (image C). Once Detail has been selected, the contact's name and number and date/time are presented (image D).



Address Book/Directory

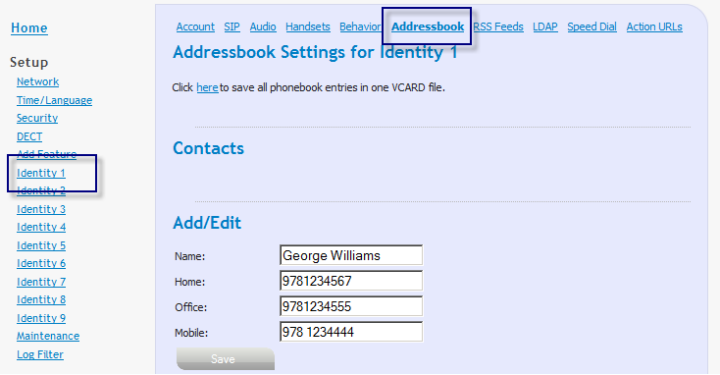
Each SIP identity on the snom m9 can have a unique address book, and those address books can be built using any or all of the following methods:

- Manually—Contacts can be added on a one-by-one basis (detailed below).
- vCards—Contacts can be added using vCard 3.0 format via the snom m9 web interface (see Page 64). (Administrators only)
- snom ONE—Address books from snom ONE are automatically added to the m9 handset if the user has opted to include those names from the snom ONE web interface.

Adding Contacts Manually

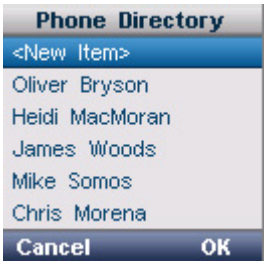
1. Log in to the m9 web interface.
2. Click the identity (at the left), then click **Address Book**.
3. Enter the contact's information in the **Add/Edit** fields.

4. Click **Save**.



Accessing Contacts from the m9 Handset

1. Press the center navigation button, followed by 📖. The contacts are displayed.



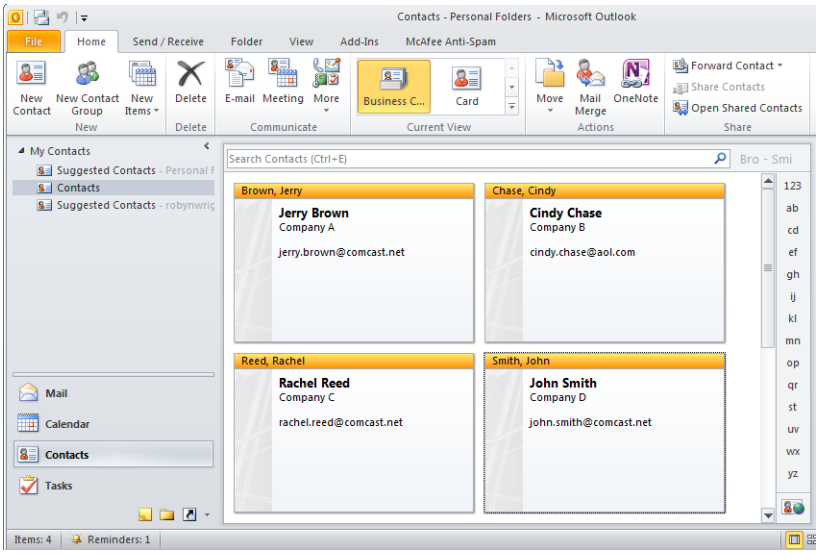
2. To edit or delete a contact, select the contact and click **Options**, then follow the prompts.

vCards

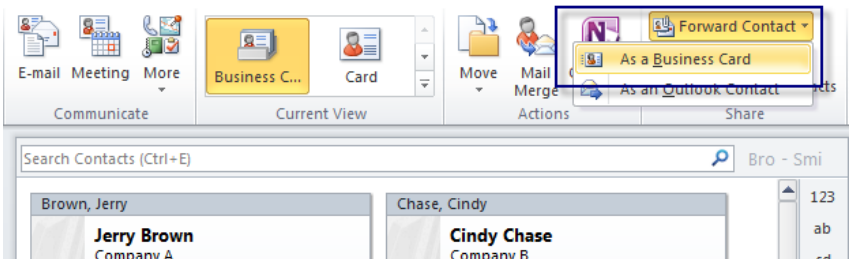
A vCard, or "virtual business card," is a means of allowing users to exchange personal information with each other. vCards carry vital directory information about the user, such as name, address, telephone number, etc., so vCards can be especially helpful when creating address books in applications, like the m9 DECT phone, that support the vCard format. The following instructions show you how to save Microsoft Outlook information into the vCard format (.vcf) and then import it to a SIP identity on the m9.

Note: If the vCard includes the calling party's picture, the picture will be displayed on the snom m9 handset when the contact calls. See Page 67 for more information.

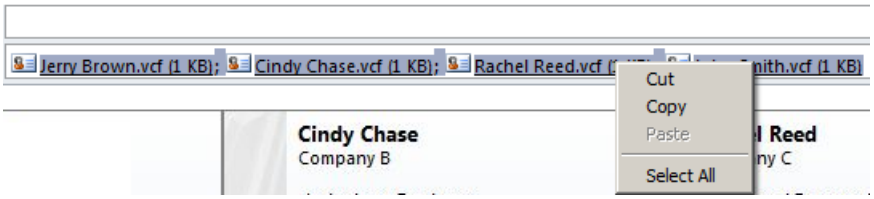
1. In a Contact folder, select the contacts for which you want to create a vCard.



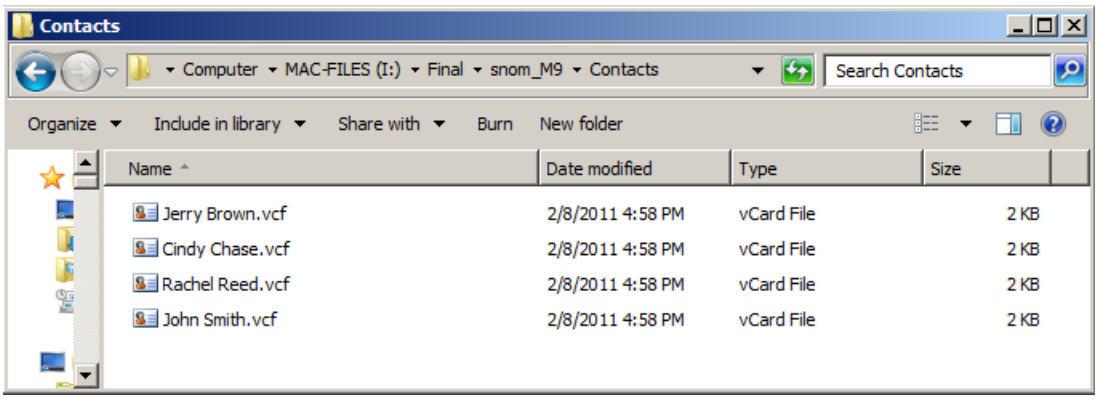
2. Click **Forward Contact** > **As a Business Card**, as shown below:



3. Select all the contacts by holding down the shift key, then right-click and copy.

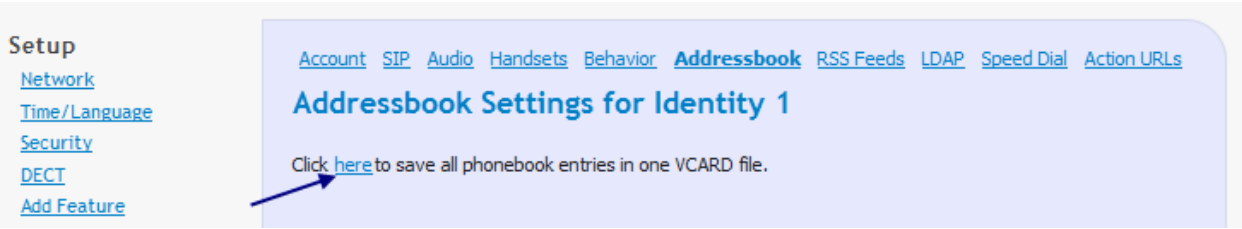


4. Paste them into a folder:

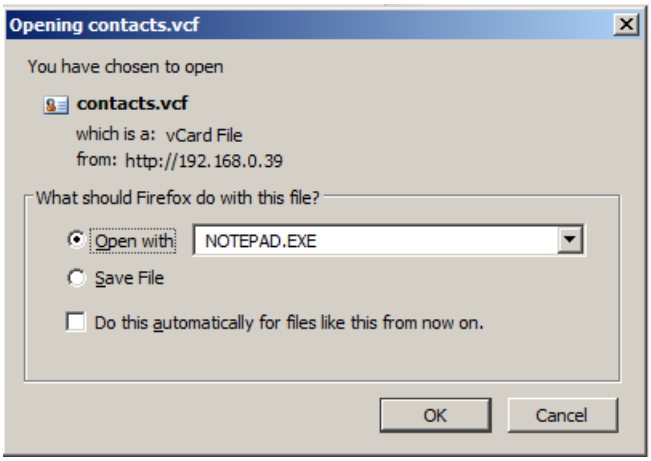


5. To upload the files to the m9 web interface, log in to the interface, click the identity, click **Addressbook**, then **Browse** (as shown below). Locate the file, then click **Upload**. Repeat this step for each .vcf file you would like to upload.

6. Once each .vcf file has been uploaded, click the link shown below to merge all contacts into one file.



7. Open the file with Notepad, or save it to a folder so that it can be used later on for other handsets.



The contacts will be separated by `BEGIN:VCARD` and `END:VCARD` tags.

Caller Picture Display

The caller picture feature allows the snom m9 handset to display the picture of the calling party. All photo pictures provided to the snom m9 base station must be in 40 × 50 pixels JPEG format.

The snom m9 provides two mechanisms for providing the calling party's picture to the snom m9 base station.

- vCards
- SIP `Call-Info` Header

vCards

The caller's picture can be displayed on the snom m9 handset as long as the snom m9 has a vCard in the user's address book and it includes the calling party's picture.

If the .vcf file includes the caller's picture, the m9 handset will display the picture of the calling party. The picture can be a URI or an embedded photo as shown below:

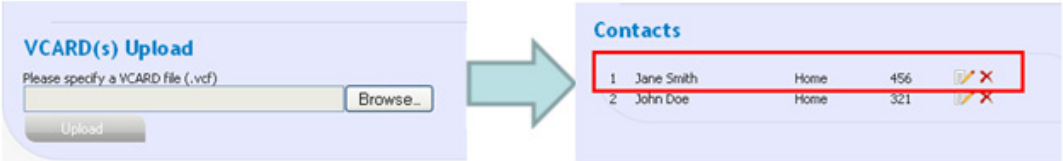
```
PHOTO;VALUE=uri:http://www.mycompany.com/photos/kelly.jpg
 PHOTO;ENCODING=b;TYPE=JPEG:MIICajCCAdOgAwIBAgICBEUwDQYJKoZIhvcN
  AQEEBQAwdzELMAkGA1UEBhMCVVMxLDAqBgNVBAoTI05ldHNjYXBlIENvbW11bm
  ljYXRpb25zIENvcnBvcmF0aW9uMRwwGgYDVQQLExNJbmZvcm1hdGlvbiBTeXN0
```

```
<...remainder of "B" encoded binary data...>
```

To use this feature, follow these steps:

1. In Microsoft® Outlook, select a Contact Card from **Contacts** or create a new contact under **File** > **New** > **Contact**.
2. Click **Add Contact Picture** and upload the picture of the contact in 40 × 50 pixels JPEG format.
3. Click **Save and Close** to save the contact.
4. Right-click the contact and click **Send as Business Card**.
5. Right-click the .vcf file, and copy/paste the file onto your computer.
6. Log on to the snom m9 Web portal.
7. Select the identity for which you want to add the vCard.
8. Upload the vCard through the "VCARD(s) Upload" section
9. The newly added vCard should be visible under Contacts.

The picture of contact will be displayed on the handset associated with the identity whenever a call is received from the contact.



SIP "Call-Info" Header

The snom m9 can also display the calling party's picture on the handset via HTTP links. For this purpose, the snom m9 base station supports the `icon` parameter of the SIP `Call-Info` header. For this feature to work, the calling party must provide a picture in the `Call-Info` header of the SIP INVITE, and the picture link must be sent in the `icon` parameter of the `Call-Info` header.

```
INVITE sip:1001@192.168.100.201;user=phone SIP/2.0
Via: SIP/2.0/UDP 10.10.10.39:5060;branch=z9hG4bK-mxcvjable35j;rport
From: <sip:1002@192.168.100.201>;tag=jseelganmn
To: <sip:1001@192.168.100.201;user=phone>
Call-ID: 3c8005f55300-eg01dlyapmmx
CSeq: 1 INVITE
Max-Forwards: 70
Contact: <sip:1002@10.10.10.39:5060;line=kuhhcc0y>;reg-id=1
X-Serialnumber: 0004132656C9
P-Key-Flags: resolution="31x13", keys="4"
User-Agent: snom370/8.5.3-OCS
Accept: application/sdp
Call-Info: icon="http://myserver.com/john.jpg"
Allow: INVITE, ACK, CANCEL, BYE, REFER, OPTIONS, NOTIFY, BENOTIFY, SUBSCRIBE, PRACK,
MESSAGE, INFO, UPDATE
Allow-Events: talk, hold, refer, call-info
```

The snom m9 then downloads the picture from the link and displays it on the handset (Image A). In the absence of a real picture, a default avatar is displayed (image B):

Using the Stopwatch

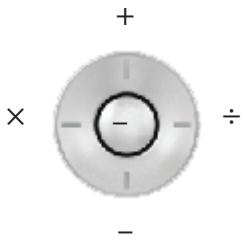
The stopwatch allows you to measure the time between activation and deactivation time. The format is `minutes:seconds:tenths of a second`. The timing functions are controlled by the Start and Cancel buttons on the handset. Pressing Cancel a second time resets the stopwatch.

1. Press the center navigation button, followed by → **Stopwatch**.
2. Press **Start** to begin the time.
3. Press **Stop** to end the time.
4. Press **Reset** to begin again.

Using the Calculator

The calculator allows you to perform the basic operations of arithmetic.

1. Press the center navigation button, followed by → **Calculator**.
2. Enter the necessary digit(s).
3. Choose an arithmatic operation using the navigation key, as shown below.



4. Enter digit(s).
5. Press the right function key for the answer.

Using the Notepad

The notepad allows you to review notes you've entered into the m9 while on phone calls. Once you're on a call, do the following:

1. Press the left function key.
2. Using the navigation wheel, navigate to Note.
3. Press the center navigation button or the right function key.
4. Begin typing. To backspace, use the left function key.
5. When finished, press OK. The message will be saved to the m9 notepad.
6. To receive the note, press the center navigation button, followed by → **Notepad**. The message will be displayed.

Setting an Appointment (Calendar)

Setting the Appointment

Important: The date and time must already be set (see Page 49).

1. Press the center navigation button, followed by → **Calendar**.
2. Select a date using the navigation wheel.

3. Press Set (right function key).
4. Select <New Item>, then press OK.
5. Enter a subject (e.g., Sales Meeting), then press OK.
6. Enter a note if you wish (e.g., "Bring new sales leads"), then press OK.

7. In the Property menu, select the frequency with which you'd like to be notified of this event, then click OK.

Property	
Deactivate	☐
Once	☐
Daily	☐
Weekly	☐
Monthly	☐
Yearly	☐

Depending on the frequency that is chosen, additional information is required. For example, if you choose "Weekly," a day of the week and the time of day is required.

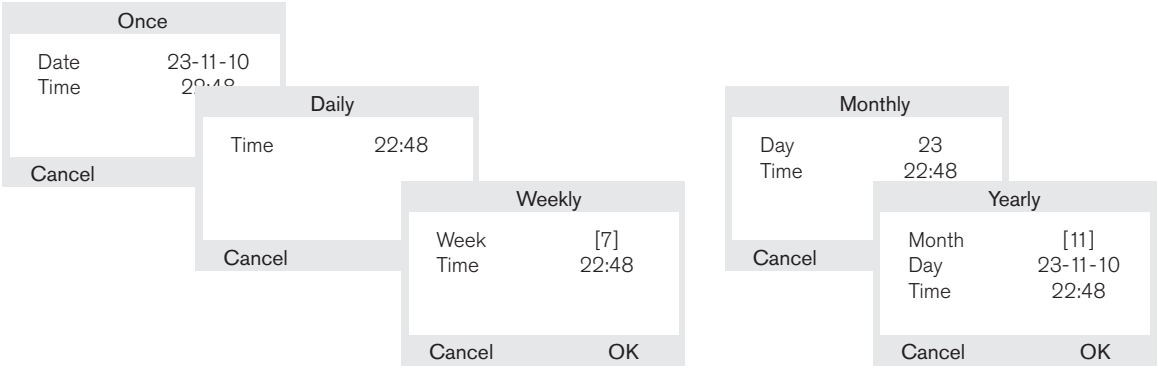


Figure 1 Frequency of Notification

8. Decide upon a volume. The volume ranges from 1 to 6 (from most quiet to loudest).
9. Use the navigation wheel (↓) to move down to the Ringtone.
10. Select a ringtone using the navigation wheel (→←). Ten ring tones are available.
11. Press OK.
12. The calendar entry is now saved, and the Calendar menu is played.

Editing the Appointment

1. Press the center navigation button, followed by → **Calendar**.
2. Click **Set**. The list of calendar entries is displayed.
3. Select an entry, then click **Options**.
4. Click **Edit**.
5. Edit the entry using the instructions from the previous section.

RSS Feeds

RSS (Really Simple Syndication) is a family of standardized web feed formats used to publish blog entries, news headlines, weather updates, and other frequently updated works. Users can subscribe to a maximum of ten RSS feeds through the phone user interface and then view them from their snom m9 handset.

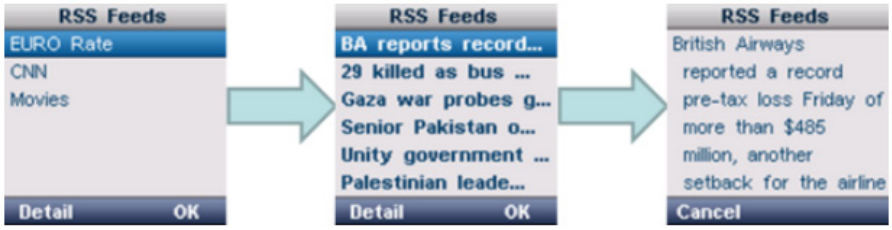
To add RSS feeds, click the Identity, followed by **RSS Feeds** as shown below. Then specify a name and URL:

To read RSS feeds from the handset:

1. Press the center navigation button, followed by → **RSS Feeds**.

2. From the list of configured RSS feeds, select a feed.
3. From the list of items, select an item.

   The contents of the selected feed item will be displayed:



Customizing the Handset

Your handset is preconfigured, but you can change some of the settings to suit your individual needs.

Customizing the Home Page

The snom m9 web portal home screen can be customized to any valid www address. To customize the home screen:

1. Create an XML file as shown below, and enter the website address into the `<advertisement_url>` tag:

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
<phone-settings>
<advertisement_url perm="RW">http://www.yahoo.com</advertisement_url>
</phone-settings>
</settings>
```

2. Save the file as XML, and upload the file to the base station under **Maintenance** > **Settings Upload**.

Changing the Language Display

1. Press the center navigation button, followed by → **Language**. Pre-installed languages are displayed according to the following firmware packages:
   - Firmware version A: English, German, French, Spanish, Italian
   - Firmware version B: English, German, Swedish, Russian, Slovenian
2. Use the ↑ and ↓ keys to select a language for the handset.
3. Press OK to save the setting.

Setting the Display

Setting the Screen Saver

A screen saver runs when the user's computer is idle. The m9 includes a selection of pre-installed screen saver images that the user can choose from.

1. Press the center navigation button, followed by → **Display** → **Screen Saver** → **Select Picture**.
2. Use the ↑ and ↓ keys to navigate through the different screen savers.
3. Press OK to save it.

Setting the Wallpaper

Wallpaper is the picture or background that is displayed when the m9 is in active mode. The m9 includes a selection of pre-installed wallpaper images (custom wallpaper cannot be uploaded).

1. Press the center navigation button, followed by → **Display** → **Wallpaper**.
2. Use the ↑ and ↓ keys to navigate through the different wallpapers.
3. To change the color of the date and time that is displayed on top of the wallpapers, use the →← keys to navigate through the options.
4. Click OK to to save your settings.

Setting the Contrast

1. Press the center navigation button, followed by → **Display** → **Contrast**.
2. Use the ↑ and ↓ keys to navigate through the five different levels of intensity.
3. Press OK to save your setting.

Setting the Backlight

1. Press the center navigation button, followed by → **Display** → **Backlight**..

2. Select a setting. The three options are described below:
   - Activate: The display goes to power-saving mode after 10 seconds, and the keypad LED is switched off to save power.
   - Deactivate: The display turns off completely after 10 seconds, and the keypad LED lights up intermittently.
   - Always: The display stays on permanently (high battery consumption mode), and the keypad LED stays lit.
3. Press OK to save the setting.

Changing Ring Tones

You can set the volume and ring tones for external calls and internal calls.

- Volume: You can choose between six volumes (1–6, from low to high). You can also turn the ringer off (0).
- Ring tones: Ten different ring tones are available, including traditional, jazz, rambler music, space music, and classical dance.

In idle status:

1. Press the center navigation button, followed by → **Audio Settings** → **Ringer Settings**.
2. Select a setting, e.g., **External Calls**.
3. Set the volume (1–6), then scroll to the next line and select a melody.
4. Press OK to save the settings.

Changing the Volume in Speaker Mode

The Ear Protection setting activates lower speaker volumes on connected snom m9 handsets. By default this setting is turned on. To re-enable the normal speaker levels on the connected handsets:

1. Log in to the m9 web interface.
2. Click the identity that belongs to the handset.
3. Click **Behavior**, then set Ear Protection to off.

Changing Advisory Tones

Your handset uses advisory tones to inform you of different activities and statuses. You can activate/deactivate the following advisory tones independently of each other. With the exception of the confirmation tone, the ring tone and volume of all advisory tones can also be customized.

- Key tones: Plays when a user presses the handset keys.
- Charging tones: Plays when the phone is placed in the charger.
- Low battery: Plays when the battery requires charging.
- MWI: Plays when the user has voicemail.
- Confirmation tone: Plays when the user selects an option on the handset, e.g., when changing the language.

To change an advisory tone:

1. Press the center navigation button, followed by → **Audio Settings** → **Advisory Tones**.
2. Select a tone, then choose **Select Tone** and press OK.
3. Use the →← keys to select a volume.
4. Scroll down to **Ringtone** and use the →← keys to select a ringtone.
5. Press **OK** to save your settings.

Activating/Deactivating Auto Answer

When auto answer is activated, when you receive a call, you can simply lift the handset out of the charging cradle without having to press the start key. If the handset is not in the cradle to begin with, the phone will automatically answer the call and become connected.

1. Press the center navigation button, followed by → **Auto Answer**.
2. Press OK to activate/deactivate (checkmark = on).

Call Forwarding

This setting activates call forwarding on the handset.

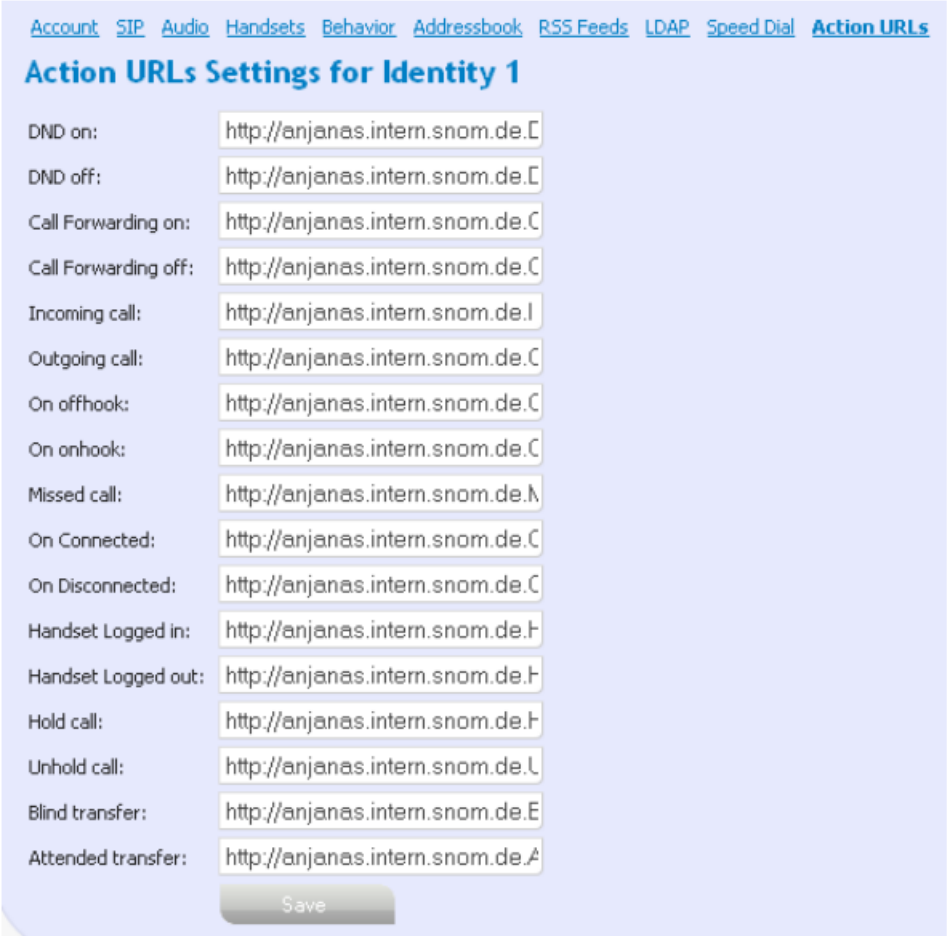
1. Press the center navigation button, followed by → **Call Forwarding**.
2. Enter your PIN (default is 0000).
3. Choose from Never, Always, or Busy and click OK.
4. Select **After timeout/sec.**, and specify a timeout (the default is 10 seconds). Click OK.
5. Select **Fwd. target** and enter the forwarding number. Click OK.

DND (No Not Disturb)

1. Press the center navigation button, followed by → **DND**.
2. Enter your PIN (default is `0000`).
3. Click OK to activate/deactivate.

Action URLs

Action URLs are HTTP GET Requests that allow the m9 to interact with web servers or CTI applications. Action URLs can be triggered by predefined events such as DND, Call Forwarding, Hold, Transfer, etc. Provisionable action URL setting `action_setup_url` enables the base station to notify the configuration server over HTTP once settings provisioning is complete.



Appendix

Rechargeable Batteries

Use only snom brand batteries that came with the handset or replacement batteries approved by snom technology:

Rechargeable Lithium-Ion battery

3.7V, 650mAh.

P/N: 60020438 or 60020438

Power Supplies/Adapters

Use only the power converters (AC/DC adapters) delivered with the base station and the phone or those power supplies expressly recommended by snom. Other power supplies may damage or even destroy the device(s).

Base Power supply:

Input: 100-240V~ 50/60Hz 0.2A

Output: 5V---1A

Charger Power supply:

Input: 100-240V~ 50/60Hz 0.2A

Output: 5.9V---0.8A

	Elementech Power Adapters (Model Numbers)	
	Base Station	**Handset Charger**
Europe without UK	AU1050507e	AU1050607e
UK	AU1050505b	AU1050605b
USA & Canada	AU1050507u	AU1050607u
Australia	AU1050505s	AU1050605s

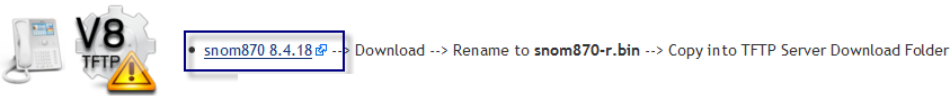
Downloading the Recovery Image

1. Go to `http://wiki.snom.com` and click **Firmware Guide** as shown below:

2. Click your phone model, then click the firmware version.

3. Click the recovery image.

4. Click the download link, and save the file.



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